CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

Making progress possible. Together.

MEMORANDUM OF AGREEMENT

FOR THE

DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS

MADE AND ENTERED INTO BETWEEN

CITY OF CAPE TOWN METROPOLITAN MUNICIPALITY

[redacted]

Contract No. 191Q/2023/24

PREAMBLE

WHEREAS tender **191Q/2023/24** was awarded to [redacted] in line with the SCM - Bid Adjudication Committee resolutions [redacted] dated 19 May 2025 for the DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS for a contract period from taking receipt of Memorandum of Agreement/Commencement Letter for a period approximately 54 months to terminate after of 1620 days inclusive of special non-working days from date of commencement, in the amount of R 2 175 446 336.10 (excluding VAT) and R 2 501 763 286.51 (including VAT);

AND WHEREAS prices will be subject to adjustment in accordance with sub clause 13.8 of the tender document;

AND WHEREAS the contingencies amount of R 151 775 325.77 or 7.5 % (excl. VAT);

AND WHEREAS it is recorded that this Contract will be governed by the **General Conditions which form part of the Conditions of Contract for Plant and Design-Build for Electrical and Mechanical Works and for Building and Engineering Works Designed by the Contractor, First Edition 1999 (Yellow Book)**, read with the Contract Specific Data ("CSD") hereto marked **"PART C1.2: CONTRACT DATA"**.

NOW THEREFORE THE PARTIES AGREE AS FOLLOWS:

1. PARTIES

The Parties to this Contract are:

1.1. **The City of Cape Town**, a metropolitan municipality, established in terms of the Local Government: Municipal Structures Act. 117 of 1998 read with the Province of the Western Cape: Provincial Gazette 5588 dated 22 September 2000, as amended ("**the Employer**"), herein represented by the **Director: Bulk Services** duly authorised hereto;

[redacted] registered in terms of the laws of the Republic of South Africa with registration numbers: [redacted] with its principal place of business situated at [redacted] he "**Contractor**"), herein represented by its duly authorised representative, [redacted] Hereinafter jointly referred to as "Parties" and in singular, a "Party".

2. INTERPRETATION

2.1. In the event of any conflict between the provisions of this Contract, the GCC, CSD and any Part attached hereto, or any other document incorporated by reference to this Contract, save to the extent expressly stated to the contrary, such conflict will be resolved by giving precedence to such different parts of this Contract in the following order of precedence:

(a) the Form of Offer and Acceptance,
(b) the Appendix to Tender within the Contract Data,

(c) the Particular Conditions within the Contract Data,
(d) these General Conditions,
(e) the Employer's Requirements,
(f) the Drawings, and
(g) the Schedules.

2.2 The provisions of this Contract supersede and replace the provisions of any previous agreement entered into between the Parties relating to the same subject matter.

3. APPOINTMENT AND DURATION

3.1. The Employer hereby appoints the Contractor to perform the Scope of Work for the Employer **on taking receipt of Memorandum of Agreement/ Commencement Letter, for a period of approximately 54 months** from **the Commencement Date**.

3.2. Unless terminated earlier in accordance with the provisions as set out in the GCC or any other provision in terms of this Contract, **this Contract shall terminate 1620 days inclusive of special non-working days from date of commencement.**

4. MUTUAL GOOD FAITH / CO-OPERATION

4.1. The Parties represent and undertake to do all such things, perform all such acts and take all steps to procure the doing of all such things and the performance of all such acts, as may be necessary or incidental to give effect to the execution of this Contract.

4.2. The Parties shall at all times during the continuance of this Contract observe the principles of good faith towards one another in the performance of their obligations in terms of this Contract.

5. OBLIGATIONS OF THE EMPLOYER

5.1. The Employer undertakes to perform its obligations in accordance with the Contract, including but not limited to the Scope of Work (**PART C3: SCOPE OF WORK**), subject to the satisfactory fulfilment of the obligations by the Contractor as set out in this Contract.

5.2. The Employer shall monitor and evaluate the Contractor's performance in respect of the Scope of Work.

6. OBLIGATIONS OF THE CONTRACTOR

6.1. The Contractor hereby agrees and undertakes to perform the Services to the Employer as set out in Scope of Work (**PART C3: SCOPE OF WORK**).

6.2. The Contractor will perform the Works as expeditiously as possible and furthermore agrees and undertakes to perform the services in accordance with the operational requirements of the Employer.

6.3. The Contractor will ensure that the Works will be of a satisfactory quality and fit for purpose.

6.4. The Contractor shall, ensure that its employees, agents, representatives, sub-contractors and suppliers comply with this Contract and all applicable Laws in the execution of the Works.

6.5. The Contractor will not conduct any activity of whatsoever nature which may be detrimental to the Employer's reputation and goodwill.

7. PRICING DATA

7.1. The Contract Price for the Works shall be as set out in the Pricing Data annexed marked "**PART C2: PRICING DATA**".

7.2. The Contractor shall not be entitled to any other consideration for the rendering of the Works other than as provided for in this Contract.

IMPORTANT TO NOTE 1:

The Contractor's complete Tender submission (that is Volumes 1 to 4), including the Tender Drawings as well as the supporting documentation submitted with the Contractor's Tender, is incorporated by reference and forms part of this Contract.

Volume 1:
Part T1: Tendering procedures
T1.1 Tender Notice and Invitation to Tender
T1.2 Tender Data

Volume 2:
Part T2: Returnable documents
T2.1 List of Returnable Documents
C1.1 Form of Offer and Acceptance
C1.2 Contract Data
C2.2 Schedules of Quantities
C2.3 Schedule of Rates for Electrical Variations
T2.2 Returnable Schedules

Volume 3:
Part C1: Agreements and Contract Data
C1.2 Contract Data
C1.3 Form of Performance Guarantee
C1.4 Form of Advance Payment Guarantee
C1.5 Occupational Health and Safety Agreement
C1.6 Protection of the Environment Declaration
C1.7 Insurance Broker's Warranty
C1.8 Contract of Temporary Employment as Community Liaison Officer
Part C2.2: Pricing data
C2.1 Pricing Assumptions
Part C3: Scope of Work
C3.1 Description of the Works
C3.2 Engineering
C3.3 Procurement
C3.4 Construction
C3.5 Management
C3.6 Annexes
Part C4: Site information
C4.1 Locality Plan

Volume 3A:
Mechanical Specifications
Section A Detailed Mechanical Specification (including General Works)
Section D Standard Specification for Mechanical Works (including General Works)
Section G Health and Safety Specification
Section H Environmental Management Specification

Volume 3B:
Electrical Specifications
Section B1 Detailed Electrical Specification (including General Works)
Section B2 Detailed Electronic Specification (including General Works)
Section B3 Standard Specification for LV and Electrical Works (including General Works)
Section B4 Standard Specification for MV Electrical Works
Section B5 General Specification SPE-II-0007 - Instrumentation
Section B6 Electrical and Electronic Design Schedules
Section B7 Asset Numbering System
Section B8 Standard for Standby Supply Soft Load Transfer Scheme
Section B9 Technical Standard for the Interconnection of Embedded Generation
Section B10 General Specification SPE-EP-0024 - NECRT
Section B11 General Specification SPE-EE-0015 - Street and Area Lighting

Volume 4:
Drawings

IMPORTANT TO NOTE 2:

All the supporting documentation (appendices, annexures and technical data sheets with supporting brochures) submitted with the Contractors Tender, pertaining to Addendums, Tender and Clarifications and Negotiations, form part of this Contract.

COMPULSORY ENTERPRISE QUESTIONNAIRE

CITY OF CAPE TOWN

DIRECTORATE: WATER AND SANITATION

CONTRACT NO. 191Q/2023/24

DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS

SCHEDULE 1: COMPULSORY ENTERPRISE QUESTIONNAIRE

The following particulars must be furnished. In the case of a joint venture, separate enterprise questionnaires in respect of each partner must be completed and submitted.

Section 1: Name of enterprise: [redacted]

Section 2: VAT registration number, if any: [redacted]

Section 2a: National Treasury Central Supplier Database registration number [redacted]

Section 2b: SARS Tax Compliance Status PIN : [redacted]

Section 3: CIDB registration number, if any: [redacted]

Section 4: Particulars of sole proprietors and partners in partnerships

N/A

** Complete only if sole proprietor or partnership and attach separate page if more than 3 partners*

Section 5: Particulars of companies and close corporations

Company registration number . [redacted]

Close corporation number . N/A

Tax reference number . [redacted]

Section 6: Foreign Bidding Suppliers	
Is tenderer the accredited representative in South Africa for the Goods / Services / Works offered?	☑ Yes ☐ No If yes, enclose proof
Is tenderer a foreign based supplier for the Goods / Services / Works offered?	☐ Yes ☑ No If yes, answer the Questionnaire to Bidding Foreign Suppliers (below)
Questionnaire to Bidding Foreign Suppliers	N/A
a) Is the tenderer a resident of the Republic of South Africa or an entity registered in South Africa?	☐ Yes ☐ No
b) Is the tenderer a resident of the Republic of South Africa or an entity registered in South Africa?	☐ Yes ☐ No

c) Does the tenderer havea permanent establishment in the Republic of South Africa?	☐Yes	☐No
d) Does the tenderer have any source of income in the Republic of South Africa?	☐Yes	☐No
e) Is the tenderer liable in the Republic of South Africa for any form of taxation?	☐Yes	☐No

The undersigned, who warrants that he / she is duly authorised to do so on behalf of the enterprise:

i) authorizes the Employer to obtain a tax clearance certificate from the South African Revenue Services that my / our tax matters are in order;

ii) confirms that the neither the name of the enterprise or the name of any partner, manager, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise appears on the Register of Tender Defaulters established in terms of the Prevention and Combating of Corrupt Activities Act of 2004 or Database of Restricted Suppliers;

iii) confirms that no partner, member, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise appears, has within the last five years been convicted of fraud or corruption;

iv) confirms that I / we are not associated, linked or involved with any other tendering entities submitting tender offers and have no other relationship with any of the tenderers or those responsible for compiling the scope of work that could cause or be interpreted as a conflict of interest; and

v) confirms that the contents of this questionnaire are within my personal knowledge and are to the best of of my belief both true and correct

Signed [redacted]

Name

Enterprise Name

* Please refer to tender file, divider 1, for JV partners completed form.

CITY OF CAPE TOWN

DIRECTORATE: WATER AND SANITATION

CONTRACT NO. 191Q/2023/24

DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS

SCHEDULE 1: COMPULSORY ENTERPRISE QUESTIONNAIRE

The following particulars must be furnished. In the case of a joint venture, separate enterprise questionnaires in respect of each partner must be completed and submitted.

Section 1: [redacted]

Section 2: VAT registration number, if any: [redacted]

Section 2a: National Treasury Central Supplier Database registration number : [redacted]

Section 2b: SARS Tax Compliance Status PIN : [redacted]

Section 3: CIDB registration number, if any: [redacted]

Section 4: Particulars of sole proprietors and partners in partnerships

** Complete only if sole propietor or partnership and attach separate page if more than 3 partners*

Section 5: Particulars of companies and close corporations

Company registration number [redacted]

Close corporation number

Tax reference number

Section 6: Foreign Bidding Suppliers	
Is tenderer the accredited representative in South Africa for the Goods / Services / Works offered?	☐ Yes ☑ No If yes, enclose proof
Is tenderer a foreign based supplier for the Goods / Services / Works offered?	☐ Yes ☑ No If yes, answer the Questionnaire to Bidding Foreign Suppliers (below)
Questionnaire to Bidding Foreign Suppliers	Not Applicable
a) Is the tenderer a resident of the Republic of South Africa or an entity registered in South Africa?	☐ Yes ☐ No
b) Is the tenderer a resident of the Republic of South Africa or an entity registered in South Africa?	☐ Yes ☐ No

c) Does the tenderer havea permanent establishment in the Republic of South Africa?	☐Yes	☐No
d) Does the tenderer have any source of income in the Republic of South Africa?	☐Yes	☐No
e) Is the tenderer liable in the Republic of South Africa for any form of taxation?	☐Yes	☐No

The undersigned, who warrants that he / she is duly authorised to do so on behalf of the enterprise:

i) authorizes the Employer to obtain a tax clearance certificate from the South African Revenue Services that my / our tax matters are in order;
ii) confirms that the neither the name of the enterprise or the name of any partner, manager, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise appears on the Register of Tender Defaulters established in terms of the Prevention and Combating of Corrupt Activities Act of 2004 or Database of Restricted Suppliers;
iii) confirms that no partner, member, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise appears, has within the last five years been convicted of fraud or corruption;
iv) confirms that I / we are not associated, linked or involved with any other tendering entities submitting tender offers and have no other relationship with any of the tenderers or those responsible for compiling the scope of work that could cause or be interpreted as a conflict of interest; and
v) confirms that the contents of this questionnaire are within my personal knowledge and are to the best of of my belief both true and correct.

Signed

Name

Enterprise Name

CITY OF CAPE TOWN

DIRECTORATE: WATER AND SANITATION

CONTRACT NO. 191Q/2023/24

DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS

SCHEDULE 1: COMPULSORY ENTERPRISE QUESTIONNAIRE

The following particulars must be furnished. In the case of a joint venture, separate enterprise questionnaires in respect of each partner must be completed and submitted

Section 1: Name of enterprise: [redacted] .....

Section 2: VAT registration number, if any: [redacted] .....

Section 2a: National Treasury Central Supplier Database registration number : [redacted] .....

Section 2b: SARS Tax Compliance Status PIN : . [redacted] .....

Section 3: CIDB registration number, if any [redacted] .....

Section 4: Particulars of sole proprietors and partners in partnerships

** Complete only if sole proprietor or partnership and attach separate page if more than 3 partners*

Section 5: Particulars of companies and close corporations

Company registration number [redacted] .....

Close corporation number N. .....

Tax reference number .....

Section 6: Foreign Bidding Suppliers Is tenderer the accredited representative in South Africa for the Goods / Services / Works offered?	☐Yes ☑No If yes, enclose proof
Is tenderer a foreign based supplier for the Goods / Services / Works offered?	☐Yes ☑No If yes, answer the Questionnaire to Bidding Foreign Suppliers (below)
Questionnaire to Bidding Foreign Suppliers	
a) Is the tenderer a resident of the Republic of South Africa or an entity registered in South Africa?	☐Yes ☐No
b) Is the tenderer a resident of the Republic of South Africa or an entity registered in South Africa?	☐Yes ☐No

c) Does the tenderer havea permanent establishment in the Republic of South Africa?	☐Yes	☐No
d) Does the tenderer have any source of income in the Republic of South Africa?	☐Yes	☐No
e) Is the tenderer liable in the Republic of South Africa for any form of taxation?	☐Yes	☐No

The undersigned, who warrants that he / she is duly authorised to do so on behalf of the enterprise:

i) authorizes the Employer to obtain a tax clearance certificate from the South African Revenue Services that my / our tax matters are in order;

ii) confirms that the neither the name of the enterprise or the name of any partner, manager, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise appears on the Register of Tender Defaulters established in terms of the Prevention and Combating of Corrupt Activities Act of 2004 or Database of Restricted Suppliers;

iii) confirms that no partner, member, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise appears, has within the last five years been convicted of fraud or corruption;

iv) confirms that I / we are not associated, linked or involved with any other tendering entities submitting tender offers and have no other relationship with any of the tenderers or those responsible for compiling the scope of work that could cause or be interpreted as a conflict of interest; and

v) confirms that the contents of this questionnaire are within my personal knowledge and are to the best of of my belief both true and correct

Signe

Name

Enterpris
Nam

PART T1: RETURNABLE DOCUMENTS

		Page
C1.1	**Form of Offer and Acceptance**	13
C1.2	**Contract Data (data provided by the Contractor)**	17
C2.2	**Schedules of Quantities**	18

CITY OF CAPE TOWN

DIRECTORATE: WATER AND SANITATION

CONTRACT NO. 191Q/2023/24

DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS

C1.1 Form of Offer and Acceptance

Offer

The employer, identified in the acceptance signature block, has solicited offers to enter into a contract for the procurement of:

CONTRACT NO. 191Q/2023/24 : DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS

The tenderer, identified in the offer signature block, has examined the documents listed in the tender data and addenda thereto as listed in the returnable schedules, and by submitting this offer has accepted the conditions of tender.

By the representative of the tenderer, deemed to be duly authorized, signing this part of this form of offer and acceptance, the tenderer offers to perform all of the obligations and liabilities of the contractor under the contract including compliance with all its terms and conditions according to their true intent and meaning for an amount to be determined in accordance with the conditions of contract identified in the contract data.

THE OFFERED TOTAL OF THE PRICES INCLUSIVE OF VALUE ADDED TAX IS:

Two billion five hundred one million seven hundred sixty-three thousand two hundred eighty-six rand and fifty-one

cents (in words);

R 2 501 763 286.51 (in figures)

This offer may be accepted by the employer by signing the acceptance part of this form of offer and acceptance and returning one copy of this document to the tenderer before the end of the period of validity stated in the tender data, whereupon the tenderer becomes the party named as the contractor in the conditions of contract identified in the contract data.

Signature(s) . . . . . .

Name(s) . . . . . .

Capacity . . . . . .

for the tenderer

(Name of organization/tenderer) . . . . . .

(Address of organization/tenderer) . . . . . .

. . . . . .

Name and signature of witness . . . . . Date . . . . . .

. . . . . .

For official use.		
INITIALS OF CITY OFFICIALS AT TENDER OPENING		
1.	**2.**	**3.**

Acceptance

By signing this part of this form of offer and acceptance, the employer identified below accepts the tenderer's offer. In consideration thereof, the employer shall pay the contractor the amount due in accordance with the conditions of contract identified in the contract data. Acceptance of the tenderer's offer shall form an agreement between the employer and the tenderer upon the terms and conditions contained in this agreement and in the contract that is the subject of this agreement.

The terms of the contract are contained in:

Part C1: Agreements and contract data (which includes this agreement)
Part C2: Pricing data
Part C3: Scope of work
Part C4: Site information

and drawings and documents or parts thereof, which may be incorporated by reference into the above listed Parts.

Deviations from and amendments to the documents listed in the tender data and any addenda thereto as listed in the returnable schedules as well as any changes to the terms of the offer agreed by the tenderer and the employer during this process of offer and acceptance, are contained in the schedule of deviations attached to and forming part of this form of offer and acceptance. No amendments to or deviations from said documents are valid unless contained in this schedule.

The tenderer shall within two weeks after receiving a completed copy of this agreement, including the schedule of deviations (if any), contact the employer's agent (whose details are given in the contract data) to arrange the delivery of any securities, bonds, guarantees, proof of insurance and any other documentation to be provided in terms of the conditions of contract identified in the contract data. Failure to fulfil any of these obligations in accordance with those terms shall constitute a repudiation of this agreement.

Notwithstanding anything contained herein, this agreement comes into effect on the date when the parties have signed the table below and confirms receipt from the employer of one fully completed original copy of this agreement, including the schedule of deviations (if any). The tenderer (now contractor**)** shall within five working days of the agreement coming into effect notify the employer in writing of any reason why he cannot accept the contents of this agreement as a complete and accurate memorandum thereof, failing which the agreement presented to the contractor shall constitute the binding contract between the parties.

The Parties	Employer	[redacted]
Business Name	City of Cape Town	
Business Registration	Not applicable	
Tax number (VAT)	4500193497	
Physical Address	Civic Centre 12 Hertzog Boulevard Cape Town 8000	
Accepted contract sum including tax	R 2 501 763 286.51	R 2 501 763 286.51
Accepted contract duration	On taking receipt of Memorandum of Agreement/ Commencement Letter, for a period of approximately 54 months, from date of commencement and terminate after 1620 days inclusive of special non-working days from date of commencement. .	
Signed – who by signature hereto warrants authority		
Name of signatory		
Signed: Date		
Signed: Location		
Signed: Witness		

Name of Witness		

Schedule of Deviations

Notes:

1. The extent of deviations from the tender documents issued by the employer before the tender closing date is limited to those permitted in terms of the conditions of tender.
2. A tenderer's covering letter shall not be included in the final contract document. Should any matter in such letter, which constitutes a deviation as aforesaid, become the subject of agreements reached during the process of offer and acceptance, the outcome of such agreement shall be recorded here.
3. Any other matter arising from the process of offer and acceptance either as a confirmation, clarification or change to the tender documents and which it is agreed by the parties becomes an obligation of the contract shall also be recorded here.
4. Any change or addition to the tender documents arising from the above agreements and recorded here, shall also be incorporated into the final draft of the contract.

1 Subject	Addendum No. 1
Details	Included information regarding addressing Tenderer's queries from the clarification meeting, minutes of the site clarification meeting, and amendments to the Tendering Procedures and Tender Data, Contract Data, Scope of Works, Returnable Schedules, Schedule of Quantities, Specifications, Tender Drawings.
2 Subject	Addendum No. 2
Details	Provided information on the extension of the Tender closing date to 18 July 2024 as well as addressing Tenderer's queries and amendments to the Contract Data, Scope of Works, Returnable Schedules, Schedule of Quantities, Specifications, and Tender Drawings.
3 Subject	Addendum No. 3
Details	Provided information on the extension of the Tender closing date to 02 August 2024.
4 Subject	Addendum No. 4
Details	Included amendments to the Scope of Works, Returnable Schedules, Schedule of Quantities, and Tender Drawings.
5 Subject	Clarification 1 and Response Letter
Details	Returnable schedules.
6 Subject	Clarification 2 and Response Letter
Details	Zero Rates and Included Rates
7 Subject	Negotiated Rates
Details	Outcome of the Negotiation of Rates for Preferred Bidder

By the duly authorised representatives signing this agreement, the employer and the tenderer agree to and accept the foregoing schedule of deviations as the only deviations from and amendments to the documents listed in the tender data and addenda thereto as listed in the returnable schedules, as well as any confirmation, clarification or changes to the terms of the offer agreed by the tenderer and the employer during this process of offer and acceptance.

It is expressly agreed that no other matter whether in writing, oral communication or implied during the period between the issue of the tender documents and the receipt by the tenderer of a completed signed copy of this agreement shall have any meaning or effect in the contract between the parties arising from this agreement.

CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

FINANCE
SUPPLY CHAIN MANAGEMENT

Supply Chain Management
Email: SCM.WaterandSanitation2@capetown.gov.za

07 May 2024

NOTICE TO TENDERERS NO: 1

Pages 15

TENDER NUMBER: **191Q/2023/24**

DESCRIPTION: **DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION FOR THE MACASSAR WASTEWATER TREATMENT WORKS**

CLOSING DATE: **18 JUNE 2024**

BOX NUMBER: **121**

Dear Sir/Madam

Your attention is specifically drawn to the following amendments which are to be made to the Tender Document for the above tender, in terms of tender clause C3.2 of the Standard Conditions of Tender and you will be deemed to have made allowance necessary to provide for these amendments in your Tender offer.

Tenderers should take note of the following:

ADDENDUM NO 1 TO TENDER DOCUMENTS

Note, in some instances amendments are highlighted in yellow for ease of reference.

ATD1-1 **TENDERING PROCEDURES AND TENDER DATA**

ATD1-1.1 **Volume 1: Tendering Procedures**
Part T1.2: Tender Data

ATD1-1.1.1 Under Clause C.2.1.4.3 (functionality criteria table) amend the "description of functionality criteria" for item 1.1 & 1.2 to be as follows:

1	**Demonstrated experience of the tendering entity with respect to comparable projects**
1.1	Wastewater treatment and water treatment related projects (local or international) with a project construction value for the "mechanical portion of the works only" is greater than R 200 million (per individual project) excluding VAT (escalated to date of tender closure by the Employer/Employer's Representative using an escalation factor of 7.5% per annum) successfully completed within the past fifteen (15) years: Mechanical Contractor (Principle Contractor)
1.2	Wastewater treatment, water treatment and industrial related projects (local or international) with a project construction value for the "electrical (including bulk and MV), control and instrumentation portion of the works only" greater than R 120 million (per individual project) excluding VAT (escalated to date of tender closure by the Employer/Employer's Representative using an escalation factor of 7.5% per annum) successfully completed within the past fifteen (15) years: Electrical Contractor/Subcontractor

ATD1-1.1.2 After the last sentence of Clause C.2.13.11 c) (Page 17) add the following,

"Tenderers are also requested to submit completed electronic versions (Microsoft Excel) of the Bills of Quantities and Technical Data Sheets as an unofficial version, i.e., filled in by the tenderer in the format issued by the Employer. The unofficial version shall not be regarded as a substitute for the documents as contemplated in C2.13.3."

ATD1-1.1.3 Replace the last sentence of Clause C.2.3.11 d) (Page 17) with the following,

"The Employer may through addenda re-issue the Bills of Quantities and Technical Data Sheets in its entirety, as electronic versions. Tenderers may complete these documents electronically and print to hard copy in the same format as contemplated in C.2.13.11 c). In this instance the printed submission shall be returned in its entirety and tenderers shall unbind the affected tender documents and replace the hardcopy with the printed version, and then rebind the affected tender documents to its original condition."

ATD1-2 SCHEDULE (BILL) OF QUANTITIES

ATD1-2.1 Volume 2: Returnable Documents, Part T2: Returnable Documents – C2.2 Schedule of Quantities

ATD1-2.1.1 Bill M2 Screens, Water Launders, Washing Screw Presses & Skip Dolly: Item M2-13 added to Bill M2. Remove page 53 and replace with page 53-R.

See Appendix C.

ATD1-2.1.2 Bill M4 Sluice Gates, Hand Stops and Weirs: Additional sluice gates and amendments to Weir descriptions. Remove page 55 to page 57 and replace with page 55-R to page 57-R.

See Appendix D.

ATD1-2.1.3 Bill M7 Vertical Shaft Mixers: Mixers for main sludge pump station broken up. Remove page 62 and replace with page 62-R.

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Mixers for Main Sludge Pump Station sump (incl. motor and gearbox)				
M7-8		a. WAS Sump	No	2		
M7-9		b. Primary sludge sump	No	1		
M7-10		c. Thickened Sludge	No	2		

See Appendix E.

ATD1-2.1.4 Bill M8 Fine Bubble Diffused Aeration: Replace item M8-6 & M8-7 with the following:

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
M8-6		V-Port knife gate valve including electric actuator for V-Port knife gate valve modulation	No	24		
M8-7		Manual isolation knife gate valve (upstream of each V-Port knife gate valve)	No	24		

ATD1-2.1.5 Bill M16 Scum Pump Station: The Scum Pump Station has been removed from the scope of works. Bill M16 is renamed to "*Return flow pump station*". Remove page 77 and replace with page 77-R.

See Appendix F.

ATD1-2.1.6 Bill M17 TSE Pump Station: Item numbers and descriptions amended. Remove page 78 and replace with page 78-R.

See Appendix G.

ATD1-2.1.7 Bill M18 Service Water Pump Station:

Replace the Quantity = 2 for Item M18-4 and replace with Quantity = 3.

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
M18-4		Automatic self-cleaning filters	No	3		

ATD1-2.1.8 Bill M27 Sludge Dewatering Equipment: Items added to Bill 27 (see highlighted below). Remove page 93 to page 95 and replace with page 93-R to page 95-R. See Appendix H.

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
M27-22		Sludge cake lube pumps (Progressive cavity pumps complete with drive units, couplings, shaft guards, baseplates, etc	No	10		
M27-23		Sludge cake lube discharge pipework, terminating at the silos (including pipe supports, pressure gauges, pressure and flow switches, pressure relief valves, isolation valves, control valves, etc.) for Item 22 above.	Sum	1		
M27-33		All materials and equipment summarized in Bill M27, Items 22 and 23).	Sum	1		

ATD1-2.1.9 Bill M31 Lifting Equipment: Workshop lifting equipment added to Bill (highlighted in yellow below). Remove page 101 to page 103 and replace with page 101-R to page 103-R.

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
M31-20		Trolley for transporting mixers	Sum	1		
M31-21		Lifting Equipment Workshop: Overhead Travelling Crane	Sum	1		

See Appendix I.

ATD1-2.1.10 Bill M34 Sundries: Items added for inspection of equipment. Remove page 119 to page 121 and replace with page 119-R to page 121-R.

See Appendix J.

ATD1-2.1.11 Bill M36 Maintenance Inspections (Part Time): Amend the "Quantity" of Item M36-1 from "6" to "*1*"

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
M36-1		Providing insurances for Maintenance for a total period of 6 months after the Defects notification period	Sum	1		

ATD1-2.1.12 Bill E11 Earthing: Omit items E11-1 to E11-5, E11-15 to E11-21, E11-22 to E11-24, E11-33 to E11-39 from the BOQ.

ATD1-2.1.13 Bill E14 Measuring Instruments: Remove Bill E14 (page 188 to page 211) and replace it with Bill E14 (page 188-R to 199-R) in Appendix K.

ATD1-2.1.14 BOQ Summary, Page 232: Remove the description "SCUM PUMP STATION" for Bill M16 and replace with "*RETURN FLOW PUMP STATION*".

ATD1-2.1.15 Summary of Bills: Allowance for Escalation and Foreign Exchange Adjustment removed. Remove page 234 and replace with page 234-R.

See Appendix L.

ATD1-3 RETURNABLE SCHEDULES

ATD1-3.1 Volume 2: Returnable Documents
Part T2: Returnable Documents – T2.2 Returnable Schedules

ATD1-3.1.1 Schedule 17, Schedule of estimated monthly expenditure: Remove page 274 and replace with page 274-R.

See Appendix M.

ATD1-3.1.2 Schedule 28, Technical data sheets. Data sheet No.DS-II-0004: Instrumentation, item 18.09, No. Axis.

Replace

"3 (x,y,z)"

With

"1 (radial)"

ATD1-4 RETURNABLE SCHEDULES

ATD1-4.1 Volume 3: Draft Contract
Part C1: Agreements and Contract Data – C1.2 Contract Data

ATD1-4.1.1 Appendix to tender: Amend the "Amount of Performance Security" to "7%" on page 607.

ATD1-4.1.2 Appendix to tender: Amend the "Maximum amount of Delay penalties" on page 607 to be as follows:

"The penalty for delay shall be: 1/50th of 1% of the of the Contract Award Amount (as per C1.1 Form of Offer and Acceptance) per calendar day.

The maximum amount of Delay penalties shall be limited to 20% of the Contract Value (as per C1.1 Form of Offer and Acceptance).

The penalty for delay for sectional completion shall be as follows:

1. The penalty for delay for sectional completion of scheduled activities which does not impact the critical path of other construction Contracts (see Clause 3.1.9 of Part C3, Scope of Work) will be a "percentage" of 1/50 of 1% of the Contract Award Amount (as per C1.1 Form of Offer and Acceptance) per calendar day. This "percentage" shall be the "Contract Award Amount of the Portion of Works subject to Sectional Completion" over "the Contract Award Amount excluding contingencies and contract price adjustment (i.e., escalation)".

2. The penalty for delay for sectional completion for scheduled activities which impacts the critical path of other construction Contracts (see Clause 3.1.9 of Part C3, Scope of Work) will result in full penalties being applied, i.e., 1/50 of 1% of the Contract Award Amount (as per C1.1 Form of Offer and Acceptance) per calendar day"

ATD1-4.1.3 Appendix to tender: Amend the "total advance payment " from "0% deposit" to "in accordance with the advance payment schedule", namely 50% as specified on page 609.

ATD1-5 DESCRIPTION OF THE WORKS

ATD1-5.1 Volume 3: Draft Contract
Part C3: Scope of Works – C3.1 Description of the Works

ATD1-5.1.1 Section 3.1.3 EXTENT OF THE WORKS, item r): Delete "Odour control" scope for Primary Sludge Holding Tanks.

ATD1-5.1.2 Section 3.1.3 EXTENT OF THE WORKS, Item q) and Item r). Delete the following:

q). Mixers for four (4) WAS holding tanks

r). Mixers for two (2) PS holding tanks.

ATD1-6 ENGINEERING & MANAGEMENT

ATD1-6.1 Volume 3: Draft Contract
Part C3: Scope of Works – C3.2 Engineering

ATD1-6.1.1 Clause 3.2.5.10: Add the following sentence after the last sentence of the last paragraph.

"For pricing purposes, Zone 2 rated equipment shall be assumed for the abovementioned process areas."

ATD1-6.2 Volume 3: Draft Contract
Part C3: Scope of Works – C3.5 Management

ATD1-6.2.1 Clause 3.5.7: Replace the table of "access dates" with the table provided under Appendix N

ATD1-7 MECHANICAL SPECIFICATIONS

ATD1-7.1 Volume 3A: Mechanical Specification
Section A: Detailed Mechanical Specification

ATD1-7.1.1 Specification 1: SCOPE, Clause 1.1.10.

Delete:

a) Submersible Mixers

ATD1-7.1.2 Specification 4: Design, Clause 4.11.2.7.

Replace:

"The 3 UV channels shall each be equipped with 3 open channel UV banks, fully kitted with UV lamps, to provide a UV dose to the effluent. A UVT (UV Transmittance) sensor and 2 ultrasonic level sensors shall be installed at the UV Screen Outlet Channel, upstream of the UV channels, to measure the effluent UVT and water level UV channels, respectively. The UV system shall automatically adjust the dosing intensity, number of duty channels and number of duty banks per channel based on the UVT measurement and flow through the channels. At minimum flow through the UV channels, only 1 UV channel and its 3 banks shall be duty, the rest of the system shall be on standby. The number of duty channels and duty banks shall increase with increasing flow until the

maximum flow conditions are reached, where all 3 UV channels and all 9 banks shall be duty. This shall coincide with PWWF through the Works."

With:

"The 3 UV channels shall each be equipped with open channel UV banks, fully kitted with UV lamps, to provide a UV dose to the effluent. A UVT (UV Transmittance) sensor and 2 ultrasonic level sensors shall be installed at the UV Screen Outlet Channel, upstream of the UV channels, to measure the effluent UVT and water level in the UV channels, respectively. The UV system shall automatically adjust the dosing intensity, number of duty channels and number of duty banks per channel based on the UVT measurement and flow through the channels. At minimum flow through the UV channels, only 1 UV channel and its banks shall be duty, the rest of the system shall be on standby. The number of duty channels and duty banks shall increase with increasing flow until the maximum flow conditions are reached, where all UV channels and all banks shall be duty. This shall coincide with PWWF through the Works."

ATD1-7.1.3 Specification 7: INSPECTIONS, Clause 7.1.

Replace:

"The Contractor shall make all arrangements and carry all costs for the Engineer (4pax) and Employer (2pax), or an Engineer approved inspection authority, to inspect equipment for acceptance prior to despatch to Site."

With:

"The Contractor shall make all arrangements and carry all costs for the Engineer (2pax) and Employer (1pax), or an Engineer approved inspection authority, to inspect equipment for acceptance prior to despatch to Site."

ATD1-7.1.4 Specification 14: PUMPS, Clause 14.4.4.1, Paragraph 3, in the second sentence

Replace:

"The pump speed shall exceed 400 rpm."

With:

"The pump speed shall NOT exceed 400 rpm."

ATD1-7.1.5 Specification 14: PUMPS, Clause 14.4.6, Paragraph 3, in the first sentence

Replace:

"20 %."

With:

"30 %."

ATD1-7.1.6 Specification 14: PUMPS, Clause 14.4.7 & 14.4.8. Replace the specification page 62 entirely with the provided specification page 62-R in Appendix O.

ATD1-7.1.7 Specification 25: SLUICE GATES , Clause 25.2. Replace the specification page 136, page 137 and page 138 entirely with the provided specification page 136-R, page 137-R and page 138-R in Appendix P.

ATD1-7.1.8 Specification 27: ODOUR CONTROL AT INLET WORKS AND SLUDGE STREAM, Clause 27.4. Replace Table 1 and Table 2 under Clause 27.4.1.2 with the tables below (amended values in yellow highlight).

Table 1: Raw Gas Flowrates at Inlet Works

Process Unit/Structure	Odour Air Flow rate (Nm^3/hr)
Common sump upstream of the inlet works first lift screw pumps	410
Inlet works screw pump channels	2150
Inlet works channels	3400
Vortex type grit chambers	2000
Outlet Channels and Flume Chamber	1700
Common sump upstream of the second lift screw pumps	400
Second lift screw pump channels	2000
All skips	300
PST 6-way splitter	450
PST launder channels	1400

Table 2: Raw Gas Flowrates for Gravity thickener and main sludge pump station sump

Process Unit/Structure	Odour Air Flow rate (Nm^3/hr)
Main sludge transfer pump station sump	1200
Gravity thickener tanks	1200

ATD1-7.1.9 Specification 27: ODOUR CONTROL AT INLET WORKS AND SLUDGE STREAM, Clause 27.4.1.2, Second sentence of the last paragraph.

Delete:

"This equates to an odorous air flow rate of 13 038 Nm3/hr for the inlet works and 2082 Nm3/hr for Gravity thickener and main sludge pump station sump."

ATD1-7.1.10 Specification 28 & 33: PRIMARY SETTLING TANKS & SECONDARY SETTLING TANKS, Clause 28.4.7 & 33.5.7. Replace the third paragraph under 28.4.7 & 33.5.7 with the following:

"The scraper support downlegs shall be adequately sized and shall be firmly supported from the bridge."

ATD1-7.1.11 Specification 28: PRIMARY SETTLING TANKS, Clause 28.5. Replace the "coating" specification for "Wheels Hubs" and "Stilling Chamber" with the following (highlighted in yellow):

ITEM	MATERIAL	COATING
Wheel Hubs	Cast Iron	HDG - to SANS 121 or Painted
Stilling Chamber	316 stainless steel	Pickled and passivated

ATD1-7.1.12 Specification 33: SECONDARY SETTLING TANKS, Clause 33.7: Replace the "coating" specification for "Wheels Hubs", "Wheel Tyres" and "Stilling Chamber" with the following (highlighted in yellow):

ITEM	MATERIAL	COATING
Wheel Hubs	Cast Iron	HDG - to SANS 121 or Painted
Wheel Tyres	Polyurethane	Not applicable

ITEM	MATERIAL	COATING
Stilling Chamber	316 stainless steel	Pickled and passivated

ATD1-7.1.13 Specification 29: VERTICAL SHAFT MIXERS, Clause 29.1. Paragraph 1, sentence 1

Replace:

"The Contractor shall provide 58 vertical shaft mixers."

With:

"The Contractor shall provide 64 vertical shaft mixers."

ATD1-7.1.14 Specification 31: FINE BUBBLE DIFFUSED AERATION SYSTEM, Clause 31.3. Delete the table of performance requirement after the 4th paragraph in its entirety. The fine bubble diffused aeration system performance shall be based on the performance requirements as set out in Section 31.3 (a). to 31.3 (r). Therefore, Tenderer's shall be responsible for determining the system flow rate and pressure drop based on their chosen equipment in collaboration with the OEM suppliers for the individual system components.

ATD1-7.1.15 Specification 31: FINE BUBBLE DIFFUSED AERATION SYSTEM, Clause 31.3, Paragraph 7.

Replace:

The Standard Oxygen Transfer Rate (SOTR) in Tap Water at 20°C and nil dissolved oxygen have been estimated by the Engineer to be 136 561 kgO_2/day (average oxygen requirement) and 168 318 kgO_2/day (peak oxygen requirement), respectively, for maximum expected wastewater temperature and is based on the following assumptions/or/criteria:

With:

"The Standard Oxygen Transfer Rate (SOTR) in Tap Water at 20°C and nil dissolved oxygen have been estimated by the Engineer to be 153 137 kgO_2/day (peak oxygen requirements) for maximum expected wastewater temperature and is based on the following assumptions/or/criteria:"

ATD1-7.1.16 Specification 31: FINE BUBBLE DIFFUSED AERATION SYSTEM, Clause 31.3.

Replace the following:

b) Actual Oxygen Transfer Rate under Site Conditions (AOTR) of 52 330 (average oxygen requirement) and 64 530 kgO_2/day (peak oxygen requirement), respectively, for maximum expected wastewater temperature.

o) Minimum Efficiency of Blowers = 75 %

p) Minimum Foul Factor for Diffusers (Losses at Diffusers) = 0.9

r) Standard Oxygen Transfer rate (Oxygenation Rate) of Aerators provided by Manufacturers (20°C and 1 atm) = 4 kgO/kW.hr

With:

b) Actual Oxygen Transfer Rate under Site Conditions (AOTR) of 64 530 kgO_2/day (peak oxygen requirements), for maximum expected wastewater temperature.

o) Minimum Efficiency of Blowers = 90 % [Supplier Specific]

p) Minimum *Foul* Factor for Diffusers (Losses at Diffusers) = 0.9 [Supplier Specific]

r) Standard Oxygen Transfer *rate (Oxygenation Rate) of Aerators provided by Manufacturers (20° C and 1 atm) = 4 kgO/kW.hr [Supplier Specific]*

ATD1-7.1.17 Specification 31: FINE BUBBLE DIFFUSED AERATION SYSTEM, Clause 31.3. Delete the last paragraph and replace with the following:

Tenderers will need to calculate the Standard Oxygen Transfer Rate (SOTR) based on the Actual Oxygen Transfer Rate under site conditions (AOTR) of 64 530 kgO_2/day (peak oxygen requirements) and assumptions/or/criteria as provided above. Tenderers will be required to confirm the above assumptions/or/criteria with the Equipment Supplier. It is the Contractor's responsibility to ensure that equipment offered and supplied will meet the AOTR as specified in the Contract Documents.

A summary of the Engineer's estimates of the aeration requirements at peak, average and minimum conditions, for the commissioning stage and at the design capacity of 80 Ml/d, is provided below:

Commissioning Stage Scenario		
Condition	*AOTR (kgO_2/d)*	*SOTR (kgO_2/d)*
Peak	*35411*	*84034*
Average	*28716*	*68147*
Minimum	*14164*	*33614*
Design Capacity Scenario		
Condition	*AOTR (kgO_2/d)*	*SOTR (kgO_2/d)*
Peak	*64530*	*153137*
Average	*52330*	*124186*
Minimum	*25812*	*61255*

ATD1-7.1.18 Specification 31: FINE BUBBLE DIFFUSED AERATION, Clause 31.4.2, paragraph 1.

Add the following paragraph after the first sentence:

"A manual isolation knife gate valve shall be installed upstream of all the electrically actuated modulating v – port knife gates."

ATD1-7.1.19 Specification 31: FINE BUBBLE DIFFUSED AERATION, Clause 31.5.2.1, Paragraph 3, in the first sentence

Replace:

"The maximum pressure drop across a clogged filter shall not exceed 250 kPa."

With:

"The maximum pressure drop across a clogged filter shall not exceed 250 Pa."

ATD1-7.1.20 Specification 31: FINE BUBBLE DIFFUSED AERATION, Clause 31.5.2.2, Item numbered 31.5.2.2 f)

Replace:

"A blow off valve silencer which shall direct air into the blower compact enclosure. The air released into the enclosure shall not increase the temperature of the blower intake air and shall not force the blower into a trip condition."

With:

"A blow off valve silencer which shall direct air away from the blower enclosure. The released air shall be directed out of the building, away from any walkways, access staircases, other equipment and or areas directly accessed by personnel. The design of the air release pipe shall be so such as to avoid ingress of water, sand or dust back into the blower or Blower house."

ATD1-7.1.21 Specification 31: FINE BUBBLE DIFFUSED AERATION, Clause 31.5.2.3, paragraph 10, sentence 2

Replace:

"A minimum clearance of 300 mm shall be allowed for all around."

With:

"A minimum clearance of 500 mm shall be allowed for all around."

ATD1-7.1.22 Specification 31: FINE BUBBLE DIFFUSED AERATION, Clause 31.7 paragraph 7, sentence 1

Replace:

"All motors shall operate between the range of 400 - 690 V, 3 phase at 50 Hz, and at a maximum air temperature of 40^0C."

With:

"All motors shall operate at a nominal 400V, 3 phase at 50 Hz, and at a maximum air temperature of 40^0C."

ATD1-7.1.23 Specification 31: FINE BUBBLE DIFFUSED AERATION, Clause 31.8, paragraph 7, sentence 1

Replace:

"Oil lubricated angular contact hybrid roller bearings with steel race and Silicon Nitride (Si3N4) ceramic balls shall be used in the gearbox."

With:

"Oil lubricated angular contact hybrid roller bearings with steel race and Silicon Nitride (Si3N4) ceramic balls shall be used in the gearbox. Alternative bearing offers with proven performance records in similar application shall be accepted."

ATD1-7.1.24 Specification 31: Fine Bubble Diffused Aeration, Clause 31.11.1.1

Replace the following on third paragraph of the clause (on page 201):

"The performance tests shall be conducted in accordance with the ISO-5389 Turbo blowers or equivalent."

With:

"The performance tests shall be conducted in accordance with the ISO-5389 Turbo blowers and the test shall include the following test points:

40degC, 90% RH, 101.325kPa at 100% flow
20degC, 0% RH, 101.325kPa at 100% flow
40degC, 90% RH, 101.325kPa at 50% flow
40degC, 90% RH, 101.325kPa at maximum turndown (if greater than 50%)."

ATD1-7.1.25 Specification 37: ULTRAVIOLET (UV) DISINFECTION, Clause 37.2 paragraph 4, sentence 1

Delete:

"Four (4) banks shall be installed per channel."

ATD1-7.1.26 Specification 37: ULTRAVIOLET (UV) DISINFECTION EQUIPMENT, Clause 37.3. Add the following sentence after the first paragraph in this section:

"For Average Dry Weather Flow and Peak Dry Weather Flow, the inactivation is to be no less than 3 Log E-Coli. (999,999 counts/100 ml to 999 counts / 100 ml)."

ATD1-7.1.27 Specification 37: ULTRAVIOLET (UV) DISINFECTION EQUIPMENT, Clause 37.4. Paragraph 5, sentence 1:

Replace:

"The Contractor shall provide a control panel for each UV bank."

With:

"Each UV bank shall be independently controlled, and the controls shall be via control panels located along the UV channels."

ATD1-7.1.28 Specification 39: DRY CHLORINE SCRUBBER, Clause 39.4.4. Paragraph 2, sentence 1:

Replace:

"The mass of media required to neutralise six (6) off the one tonne gas tanks shall be based on the absorption capacity of the media."

With:

"The mass of media required to neutralise one (1) off the one tonne gas tanks shall be based on the absorption capacity of the media."

ATD1-7.1.29 Specification 40: TSE PUMP STATION, Paragraph 3, sentence 1

Replace:

"The pump station shall consist of a single pump room with one set of pumps (2 off) dedicated to the Macassar TSE Network and another set of pumps (5 off) dedicated to the Zandvliet TSE Networks, each with its own rising main and self-cleaning filters."

With:

"The pump station shall consist of a single pump room with one set of pumps (5 off) dedicated to the Macassar TSE Network and another set of pumps (2 off) dedicated to the Zandvliet TSE Networks, each with its own rising main and self-cleaning filters."

ATD1-7.1.30 Specification 57: DEWATERING MACHINE FEED PUMPS, Clause 57.1, Paragraph 1,

Replace:

"The Contractor shall design, supply, deliver, install, test, commission and uphold during the Trial Operation and Defects Notification Periods four (4) linear screen feed pumps, for WAS, and two (2) belt press feed pumps."

With:

"The Contractor shall design, supply, deliver, install, test, commission and uphold during the Trial Operation and Defects Notification Periods ten (10) linear screen feed pumps, for WAS, and four (4) belt press feed pumps, for primary sludge."

ATD1-7.1.31 Specification 58: LINEAR SCREENS AND BELT PRESSES, Clause 58.2, first paragraph, first sentence

Replace:

"The linear screens and belt presses shall be supplied complete with all ancillary equipment such as hydraulic power packs, pneumatic systems, inlet and outlet piping, sludge conveyance systems etc."

With:

"The linear screens and belt presses shall have an effective belt width of 2.5 metres and shall be supplied complete with all ancillary equipment such as hydraulic power packs, pneumatic systems, inlet and outlet piping, sludge conveyance systems etc."

ATD1-7.1.32 Specification 58: LINEAR SCREENS AND BELT PRESSES, Clause 58.3.1.1.

Replace the second sentence in paragraph two:

"The cake discharged by the WAS belt presses shall have the following characteristics."

With:

"The cake discharged by the primary sludge belt presses shall have the following characteristics."

AND;

Replace the table:

PARAMETER	UNIT	VALUE
Average cake dryness	% solids	22
Average solids recovery	%	95
Max. poly requirement	kg of active component per tonne of DS	4 to 6 – Belt press

With:

PARAMETER	UNIT	VALUE
Average cake dryness	% solids	25
Average solids recovery	%	95
Max. poly requirement	kg of active component per tonne of DS	4 to 6 – Belt press

ATD1-7.1.33 Specification 58: LINEAR SCREENS AND BELT PRESSES, Clause 58.6.1, Third paragraph on page 393. Delete the following sentence:

"The linear screen shall have a minimum effective thickening belt width of 2.5 meters."

ATD1-7.1.34 Specification 60: DEWATERED SLUDGE CAKE PUMPS. Replace the specification entirely with provided specification in Appendix Q. The following amendments were made:

1. Clause 60.1: New paragraph added after paragraph 3.
2. Clause 60.3.2: Amendments made to Paragraph 1 & 2.
3. Clause 60.3.4: New clause added to specification.
4. Clause 60.4: New paragraph added before last paragraph.
5. Clause 60.5.2: New clause added to specification.

ATD1-7.1.35 Specification 63: ODOUR CONTROL (DEWATERING BUILDING), Clause 63.3. Remove item 1 to 10 **under the clause** "If a biotrickling filter system is proposed, it shall meet the following requirements:" and replace it with the following:

1. *The biotrickling filter vessel shall be free standing operating in a counter-current manner. Each vessel shall consist of one (1) or more modules containing plastic, structured or randomised expanded clay media and one (1) top piece. Each module shall be constructed from Fiberglass Reinforced Plastic (FRP) and be designed with adequate strength to support the number of required modules. Each FRP module shall contain, as a minimum, a 1.0 mm vinyl ester resin corrosion barrier. The structural layer shall consist of isophthalic resin with chop strand and continuous glass. The exterior topcoat shall be isophthalic resin with UV resistant pigment (minimum service life of 10 years).*
2. *Biotrickling filter vessels shall not provide access to any area beneath the media or any location within the vessel where there is a chance for dripping acidic filtrate or hydrogen sulphide gas.*
3. *The reactor vessel(s) shall be provided with 316 stainless steel hold down lugs to account for all anticipated loads to comply with local wind code requirements.*
4. *The structured media shall be high porosity, chemically resistant, engineered, plastic, synthetic porous material made from polyvinyl chloride, polyethylene, polyurethane or silicate minerals.*
5. *The media shall be guaranteed not to clog or require cleaning, scrubbing, backwashing, acid-washing or replacement for a period of ten (10) years.*
6. *Media shall resist compaction or swelling due to varying moisture levels and shall not degrade when subjected to low pH (i.e., pH < 2) conditions.*
7. *The uniform structure or randomised packing of the media shall minimize the potential for short circuiting and encourage a uniform water and air flow pattern over the entire media cross sectional area.*
8. *Each reactor shall be configured with at least one (1) irrigation point which shall distribute the irrigation water evenly over the entire upper surface of the media layer.*
9. *Each spray nozzle shall be tested by the Manufacturer and a certificate of conformity supplied with the shop drawings to show that the nozzle has been tested and meets the specified standards for uniform distribution.*

10. *As a backup, the irrigation system shall be supplied with a nutrient addition system to provide the macro and micro-nutrients required by the bacteria for optimal metabolism of the odorous compounds being treated.*

ATD1-7.1.36 Specification 63: ODOUR CONTROL (DEWATERING BUILDING), Clause 63.8. Replace item 1 with the following:

1. *Measure airflow into each unit and, if necessary, adjust to the design airflow of 3,420 m^3/hr +/- 10%. Airflow balancing can be conducted by the supplier and witnessed by the Engineer and/or Contractor if desired. Airflow shall be measured at the beginning of the test period. The set position on the damper(s) and/or VFD(s) will be marked or noted. Airflow will not change as long as damper(s) and/or VFD(s) remain in position.*

ATD1-8 ELECTRICAL SPECIFICATIONS

ATD1-8.1 Volume 3B: Electrical Specification
Detailed Specifications

ATD1-8.1.1 Section B1, Specification 19: LV ELECTRICAL ACTUATORS, Clause 19.3.c. Delete the Clause

b) The control unit shall be to detach from the actuator.

ATD1-8.1.2 Section B2, Specification 8: PROCESS CONTROL SYSTEMS (PCS). After Clause 8.4.3, add the following:

"8.4.4 IOT Network Layer

If used, all IO-Link masters will be connected to the Control Network, as indicated in section 8.7.7, as well as have a separate Ethernet connection to a dedicated IOT network switch. The connection to the IOT network shall be used for analytics, remote parametrization, and maintenance of IO-Link devices."

ATD1-8.1.3 Section B2, Specification 8: PROCESS CONTROL SYSTEMS (PCS). After Clause 8.7.9.2, add the following:

"8.7.10 IOT Network

The IOT Network shall integrate all IO-link Masters and IO-Link devices using industrial Ethernet communications as described in the Technical Datasheets.
The IOT network shall be configured and cabled such that devices can be disconnected or replaced without affecting network connectivity of any other device on the network.
The IOT network shall be formed by unmanaged switches connected directly to the Control Network switch but will be separated via a VLAN configuration on the control network switch.
The IOT network shall be isolated from the Device and Control networks.
Technical Staff with sufficient user rights shall have the ability to change parameters, analyse device statistics and device health and monitor process values remotely via the Engineering PC in the control room."

ATD1-8.1.4 Section B2, Specification 14: INSTRUMENTATION. Clause 14.11.

Replace

Reference "3.2.4.11"

With

Reference "3.2.5.10"

ATD1-9 REVISED TENDER DRAWINGS

ATD1-9.1 Volume 4: Book of Drawings

ATD1-9.1.1 Replace drawing 1001780-0000-DRG-CC-0004 Rev T0 (Phasing of Works),

With drawing 1001780-0000-DRG-CC-0004 Rev T1 (Phasing of Works). See Appendix R.

ATD1-9.1.2 Replace drawing 1001780-0000-DRG-CC-0005 Rev T0 (No Go Zones Area),

With drawing 1001780-0000-DRG-CC-0005 Rev T1 (No Go Zones Area). See Appendix R.

ATD1-9.1.3 Omit drawing 1001780-0000-DRG-CC-0956 Rev T0 (Process Pipework: Longsection: (SC24))

ATD1-9.1.4 Replace drawing 1001780-0000-DRG-II-0001 Rev T0 (CONTROL NETWORK ARCHITECTURE),

*With drawing 1001780-0000-DRG-II-0001 Rev T1 (*CONTROL NETWORK ARCHITECTURE*).*

See Appendix R.

ATD1-9.1.5 Replace drawing 1001780-0000-DRG-II-0002 Rev T0 (DEWATERING WAS & PS SUB LOOP CONTROL NETWORK ARCHITECTURE),

With drawing 1001780-0000-DRG-II-0002 Rev T1 (DEWATERING WAS & PS SUB LOOP CONTROL NETWORK ARCHITECTURE)

See Appendix R.

ATD1-9.1.6 Replace drawing 1001780-0000-DRG-II-0003 Rev T0 (SCADA NETWORK ARCHITECTURE),

With drawing 1001780-0000-DRG-II-0003 Rev T1 (SCADA NETWORK ARCHITECTURE).

See Appendix R.

ATD1-10 ADDITIONAL TENDER DRAWINGS

ATD1-10.1 Volume 4: Book of Drawings

ATD1-10.1.1 It was noted in the original tender document (Volume 4) that additional drawings will be submitted as an addendum to tender.

See Appendix R.

Tenderers are to refer to Appendix A for all other queries received from bidders that not addressed above.

Tenderers are to return a signed copy of this notice/addendum with the submission of their Tender. Failure to return a signed copy of the Addendum may result in the Tender being declared non-Responsive.

Yours faithfully,

Rochelle Arendse Digitally signed by Rochelle Arendse Date: 2024.05.07 12:01:41 +02'00'

.....

For Director: Supply Chain Management

ADDENDUM No. 1

ACKNOWLEDGEMENT OF RECEIPT FOR AND ON BEHALF OF THE TENDERER: TENDER No. 191Q/2023/24

At.....on this.....Day of 2024

Signature:.....

Name of Signatory:.....
(in ink and capitals)

TENDERER:.....
(Name of firm in ink and capitals)

Enclosures:

Click on the button below to access the Dropbox link:

Addendum 01 Enclosures

Or use this link:

https://www.dropbox.com/scl/fo/yyas6dre5pm42nquzf7ig/ABl3f9zTB432ePl-taYqhxU?rlkey=m13enblfxv1eiunryvsn6f4zp&st=rdszri7o&dl=0

1) Appendix A: Tenderer's Queries
2) Appendix B: Briefing Meeting Minutes
3) Appendix C: Bill M2 Screens and Washing Screw Presses
4) Appendix D: Bill M4 Sluice Gates, Hand Stops and Weirs
5) Appendix E: Bill M7 Vertical Shaft Mixers
6) Appendix F: Bill M16 Return Flow Pump Station
7) Appendix G: Bill M17 TSE Pump Station
8) Appendix H: Bill 27 Sludge Dewatering Equipment
9) Appendix I: Bill M31 Lifting Equipment
10) Appendix J: Bill M34 Sundries
11) Appendix K: Bill E14 Measuring Instruments
12) Appendix L: Summary of Bills
13) Appendix M: Schedule 17, Schedule of Estimated Monthly Expenditure
14) Appendix N: Table of access dates
15) Appendix O: Specification 14: PUMPS, page 62-R
16) Appendix P: Specification 25: SLUICE GATES, page 136-R to page 138-R
17) Appendix Q: Specification 60: Dewatered Sludge Cake Pumps
18) Appendix R: Drawings
19) Appendix S: Electronic Version of Bills of Quantities and Technical Data Sheets

CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

FINANCE
SUPPLY CHAIN MANAGEMENT

Supply Chain Management
Email: SCM.Tenders9@capetown.gov.za

07 June 2024

NOTICE TO TENDERERS NO: 2

Pages 7

TENDER NUMBER: **191Q/2023/24**

DESCRIPTION: **DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION FOR THE MACASSAR WASTEWATER TREATMENT WORKS**

CLOSING DATE: **18 July 2024**

BOX NUMBER: **121**

Dear Sir/Madam

Your attention is specifically drawn to the following amendments which are to be made to the Tender Document for the above tender, in terms of tender clause C3.2 of the Standard Conditions of Tender and you will be deemed to have made allowance necessary to provide for these amendments in your Tender offer.

Tenderers should take note of the following:

ADDENDUM NO 2 TO TENDER DOCUMENTS

ATD2-1 **TENDERING PROCEDURES**

ATD2-1.1 **Volume 1: Tendering Procedures**
General Tender Information, Page ii

ATD2-1.1.1 Amend the closing date from "**18 June 2024**" to "**18 July 2024**"

ATD2-2 **SCHEDULE (BILL) OF QUANTITIES**

ATD2-2.1 **Volume 2: Returnable Documents, Part T2: Returnable Documents – C2.2 Schedule of Quantities**

ATD2-2.1.1 Please note that the BOQ page numbering has changed, due to additional pages added to certain Bills. The numbering of the BOQ starts from BOQ-1 to BOQ-179

ATD2-2.1.2 Bill M24 Sludge Heating Equipment: Item M24-13 and Item M24-18 added to Bill M24. Remove page 88 & 89 and replace with page BOQ-39 and BOQ-40. See Appendix B

ATD2-2.1.3 Bill M27 Sludge Dewatering Equipment.

Replace the description of Item M27-24 and Item M27-25:

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
M27-24		Allow for all the costs and expenses in connection with the design and certification of welded and bolted stainless steel walkways (including support frames, kicker plates, non-slip open floor grating, handrailing, etc).	Sum	1		

M27-25		Allow for all the costs and expenses in connection with the manufacture, corrosion protection, testing, supplying, delivery, offloading and storage of welded and bolted stainless steel walkways (including support frames, kicker plates, non-slip open floor grating, handrailing, etc).	Sum	1		

With:

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
M27-24		Allow for all the costs and expenses in connection with the design and certification of welded and bolted mild steel hot dipped galvanised walkways (including support frames, kicker plates, non-slip open floor grating, etc). Including 316 s/s handrailing.	Sum	1		
M27-25		Allow for all the costs and expenses in connection with the manufacture, corrosion protection, testing, supplying, delivery, offloading and storage of welded and bolted mild steel hot dipped galvanised walkways (including support frames, kicker plates, non-slip open floor grating, etc). Including 316 s/s handrailing.	Sum	1		

ATD2-2.1.4 Bill M34 Sundries, Item 12.

Replace:

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
M34-12		Cost fuel (Diesel) for 6 hours including delivery for precommissioning, commissioning and Trial Operation Period	hrs	194000.00		

With:

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
M34-12		Cost of fuel (Diesel) for up to 6 hours per day (including delivery) for the duration of pre-commissioning, commissioning and Trial Operation Period	Sum	1		

ATD2-2.1.5 Bill E13 Instrumentation and Fieldbus Cables: Remove Bill E13 (page 170 to page 187) and replace it with Bill E13 (page BOQ-121 to BOQ-143) in Appendix C.

ATD2-2.1.6 Bill E14 Measuring Instruments: Remove Bill E14 (page 188-R to page 199-R) and replace it with Bill E14 (page BOQ-144 to BOQ-155) in Appendix D.

ATD2-2.1.7 Bill E16 Fibre Optic Communication Systems: Remove Bill E16 (page 216 to page 220) and replace it with Bill E16 (page BOQ-160 to BOQ-165) in Appendix E.

ATD2-2.1.8 Bill E19 Programmable Logic Controller (PLC): Remove Bill E19 (page 224 to page 228) and replace it with Bill E19 (page BOQ-169 to BOQ-173) in Appendix F.

ATD2-3 RETURNABLE SCHEDULES

ATD2-3.1 Volume 2: Returnable Documents
Part T2: Returnable Documents – T2.2 Returnable Schedules

ATD2-3.1.1 Schedule 17, Schedule of estimated monthly expenditure. Replace with Schedule 17 provided in Appendix G.

ATD2-3.1.2 Schedule 28, Technical data sheets. Data sheet No.DS-EP-0004: Distribution Transformers, Item 12.07.

Replace

"No"

With

"Yes"

ATD2-3.1.3 Schedule 28, Technical data sheets. Data sheet No.DS-EP-0005: Isolation Transformers, Item 11.07 & 12.06.

Item 11.07

Replace

"No"

With

"Yes"

Item 12.06

Replace

"N/A"

With

"Yes"

ATD2-3.1.4 Schedule 28, Technical data sheets. Data sheet No.DS-II-0004: Instrumentation. Add the following after Item 31.01:

	DESCRIPTION	UNIT	SPECIFIED	OFFERED
32	**RADAR LEVEL METER**			
32.01	Manufacturer			
32.02	Sensor Model			
32.03	Transmitter Model			
32.04	Number of Relay outputs	*No.*	min 2	
32.05	Detection Range	*m*	Various	
32.06	Communication Protocol		IO-Link or 4-20 mA	
32.07	Surge Protection Required	*Yes / No*	Yes	
32.08	Local Indication Required	*Yes / No*	Yes	
32.09	IP Rating	*IP*	IP66	
32.10	Minimum accuracy	*mm*	3	
32.11	Additional datasheet from manufacturer included with tender	*Yes / No*	Yes	

ATD2-4 **AGREEMENTS AND CONTRACT DATA**

ATD2-4.1 **Volume 3: Draft Contract**
Part C1: Agreements and Contract Data – C1.2 Contract Data

ATD2-4.1.1 Appendix to tender: Amend the "Time for Completion of the whole of the Works including the Trial Operation Period ....." from "1530 days" to "1620 days".

ATD2-4.1.2 Appendix to tender: Replace the "Maximum amount of Delay penalties" provided in addendum no.01 (ATD1-4.1.2) with the following:

"The penalty for delay shall be: 1/80th of 1% of the of the Contract Award Amount (as per C1.1 Form of Offer and Acceptance) per calendar day.

The maximum amount of Delay penalties shall be limited to 20% of the Contract Value (as per C1.1 Form of Offer and Acceptance).

The penalty for delay for sectional completion shall be as follows:

1. The penalty for delay for sectional completion of scheduled activities which does not impact the critical path of other construction Contracts (see Clause 3.1.9 of Part C3, Scope of Work) will be a "percentage" of 1/80 of 1% of the Contract Award Amount (as per C1.1 Form of Offer and Acceptance) per calendar day. This "percentage" shall be the "Contract Award Amount of the Portion of Works subject to Sectional Completion" over "the Contract Award Amount excluding contingencies and contract price adjustment (i.e., escalation)".

2. The penalty for delay for sectional completion for scheduled activities which impacts the critical path of other construction Contracts (see Clause 3.1.9 of Part C3, Scope of Work) will result in full penalties being applied, i.e., 1/80 of 1% of the Contract Award Amount (as per C1.1 Form of Offer and Acceptance) per calendar day"

ATD2-4.1.3 Add the following sub-clause after the last paragraph of Clause 13.8.3.1.3:

a) Where the Contractor and the Contractor's international Supplier and/or Manufacturer secures an agreement by way of a Purchase Order (PO) to include the CPA value in the PO in the foreign currency quantum, a Forward Exchange Contract(s) [FEC] will be procured by the Contractor for the value of the Contractor's PO. When the equipment arrives on site, the

international CPA will be calculated in ZAR by utilising a weighted average of the FOREX rates in the FEC's provided. No further/future FEC will be applicable for CPA payments.

b) Where the Contractor and the Contractor's international Supplier and/or Manufacturer secures an agreement whereby the Supplier/Manufacturer will claim the CPA at a later due to extended manufacturing lead times, FEC(s) required to secure will be procured by the Contractor to value in Column A of Schedule 23. A further/future FEC will be procured to pay the CPA (CPA FEC) which will become due to the Contractor's international Supplier/Manufacturer. The FOREX rate in CPA FEC will be utilised to calculate the ZAR value of the international CPA.

c) Sub-clause a) and b) are only applicable if all provisions of Clause 13.8.3.1.3 were adhered to at time of tender.

ATD2-5 ENGINEERING & MANAGEMENT

ATD2-5.1 Volume 3: Draft Contract
Part C3: Scope of Works – C3.5 Management

ATD2-5.1.1 Clause 3.5.7: Replace the table of "access dates" provided in ATD1-6.2.1, with the one provided under Appendix H. It includes the information above and below the table provided in Appendix H. This version replaces the electronic version previously issued as part of the tender document and Addendum to tender No. 01 (Appendix N).

ATD2-6 MECHANICAL SPECIFICATIONS

ATD2-6.1 Volume 3A: Mechanical Specification
Section A: Detailed Mechanical Specification

ATD2-6.1.1 Specification 4: DESIGN. Replace clause 4.10(b) with the following:

b) Where required in terms of the battery limits provided in Volume 3, Part C3: Scope of Work, Clause 3.1.8: SCHEDULE OF CIVIL-MECHANICAL INTERFACES (BATTERY LIMITS), the Contractor shall be responsible for grouting pipework required to pass through walls, for all equipment grouting work, anchoring of equipment and closing of apertures associated with equipment to be provided in terms of this Contract.

ATD2-6.1.2 Specification 37: ULTRAVIOLET (UV) DISINFECTION EQUIPMENT, ADDENDUM NO.01. Refer to ATD1-7.1.26.

Replace:

"For Average Dry Weather Flow and Peak Dry Weather Flow, the inactivation is to be no less than 3 Log E-Coli. (999,999 counts/100 ml to 999 counts / 100 ml)."

With

"For Average Dry Weather Flow and Peak Dry Weather Flow, the inactivation is to be no less than 3 Log Faecal Coliform (999,999 counts/100 ml to 999 counts / 100 ml)."

ATD2-6.1.3 Specification 37: ULTRAVIOLET (UV) DISINFECTION EQUIPMENT, Clause 37.3, Paragraph 3 & 5.

Replace the first sentence in paragraph 3 with the following:

"The system shall achieve effluent standards less than 1000 Faecal Coliform / 100 mℓ for all flow conditions up to the peak wet weather flow listed in a) to d) above."

Replace the second sentence in paragraph 5 with the following:

"The effluent discharge limit of the upgraded system shall be less than 1000 CFU / 100 mℓ."

ATD2-6.1.4 Specification 67 "DIESEL STORAGE TANK FOR DUAL-FIRED BOILERS" added after the end of specification 66. See Appendix I.

ATD2-7 ELECTRICAL SPECIFICATIONS

ATD2-7.1 Volume 3B: Electrical Specification
Detailed Specifications

ATD2-7.1.1 Section B1, Specification 10: DISTRIBUTION TRANSFORMERS. After the last paragraph of Clause 10.4, add the following paragraph:

"A NERM relay shall be used to for protection of each NER and included in the price of the NER supply. The relay shall be commissioned and connected as part of the sub-station automation system."

ATD2-7.1.2 Section B1, Specification 12: MV CABLING. After the end of Clause 12.4, add the following paragraph:

"Only MV jointers accredited with the City of Cape Town Electricity and Generation (EGD) will be allowed to conduct jointing work."

ATD2-7.1.3 Section B1, Specification 15: LV SWITCHGEAR AND CONTROLGEAR ASSEMBLIES. Delete the first paragraph in sub-clause 15.3 and replace it with the following:

"The new MCCs shall power and control equipment associated with their designated process areas. The MCCs shall comply to the latest revision of SANS 1973-1 and the Contractor shall provide type test certificates."

ATD2-7.1.4 Section B1, Specification 15: LV SWITCHGEAR AND CONTROLGEAR ASSEMBLIES. After item (u) in Clause 15.3, page 32, add the following paragraph:

"All DOL motor starters shall be of the intelligent motor starting type, preferably matching the manufacturer of the PLC and/or LV switchgear. All DOL motor starter door requirements, as set out in the Standard Electrical Specification sub-clause 9.2 shall remain in place, except for the Amp meter which may be omitted."

ATD2-7.1.5 Section B1, Specification 20: DIESEL GENERATORS. In Clause 20.9.1, first paragraph, delete the words "double skinned" and replace with "single skinned".

ATD2-7.1.6 Section B2, Specification 16: GENERAL ELECTRONIC INSTALLATION. At the end of Clause 16.5, add the following paragraph:

"All IO-Link device connections shall be Stainless Steel 316L."

ATD2-7.1.7 Section B3: Standard specifications for Electrical Works.

In Sub-Clause 2:

Delete SANS 60439-1
Delete SANS 60439-2

Sub-Clause 7.1:

Delete SANS 60439-1
Delete SANS 60439-2

ATD2-8 REVISED TENDER DRAWINGS

ATD2-8.1 Volume 4: Book of Drawings

ATD2-8.1.1 Replace drawing 1001780-0000-DRG-CC-0004 Rev T1 (Phasing of Works),

With drawing 1001780-0000-DRG-CC-0004 Rev T2 (Phasing of Extension of Works). See Appendix J.

ATD2-8.1.2 Replace drawing 1001780-0000-DRG-CC-0009 Rev T0 (Site Demolition Plan and Diversion of Works),

With 1001780-0000-DRG-CC-0009 Rev T1 (Site Demolition Plan and Diversion of Works*). Appendix K.*

Tenderers are to refer to Appendix A for all other queries received from bidders that not addressed above.

Tenderers are to return a signed copy of this notice/addendum with the submission of their Tender. Failure to return a signed copy of the Addendum may result in the Tender being declared non-Responsive.

Yours faithfully,

[redacted]

For Director: Supply Chain Management

ADDENDUM No. 2

ACKNOWLEDGEMENT OF RECEIPT FOR AND ON BEHALF OF THE TENDERER: TENDER No. 191Q/2023/24

At……..on this……Day of ……..2024

Signature:……

Name of Signatory:…….
(in ink and capitals)

TENDERER:……..
(Name of firm in ink and capitals)

Enclosures:

Click on the button below to access the Dropbox link:

Addendum 02 Enclosures

Or use this link:

https://www.dropbox.com/scl/fo/u8b9e56gbq9qtrhxqcarr/AJVrxGHziVemi6GQUeUI_QM?rlkey=4i2bqu61tngtiy0ywwgts6lwl&st=0w5skzli&dl=0

1) **Appendix A: Tenderer's Queries and Answers**
2) **Appendix B: Bill 24 Sludge Heating Equipment**
3) **Appendix C: Bill E13 Instrumentation and Fieldbus Cables**
4) **Appendix D: Bill E14 Measuring Instruments**
5) **Appendix E: Bill E16 Fibre Optic Communication Systems**
6) **Appendix F: Bill E19 Programmable Logic Controller (PLC)**
7) **Appendix G: Schedule 17 Schedule of estimated monthly expenditure**
8) **Appendix H: Table of access dates**
9) **Appendix I: Specification 67, Diesel Storage Tank for Dual-Fired Boilers**
10) **Appendix J: Drawing 1001780-0000-DRG-CC-0004 Rev T2 (Phasing of Extension of Works)**
11) **Appendix K: Drawing 1001780-0000-DRG-CC-0009 Rev T1 (Site Demolition Plan and Diversion of Works)**
12) **Appendix L: Sludge to Gas Mass Balance**
13) **Appendix M: Electronic Version of Bills of Quantities**

CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

FINANCE
SUPPLY CHAIN MANAGEMENT

Supply Chain Representative
Email: SCM.Tenders9@capetown.gov.za

11 JULY 2024

NOTICE TO TENDERERS NO: 3

Pages 1

TENDER NUMBER: 191Q/2023/24

DESCRIPTION: DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION FOR THE MACASSAR WASTEWATER TREATMENT WORKS

CLOSING DATE: 18 JULY 2024
EXTENDED CLOSING DATE: 02 August 2024

BOX NUMBER: 121

Dear Sir/Madam

Your attention is specifically drawn to the following amendments which are to be made to the Tender Document for the above tender, in terms of tender clause C3.2 of the Standard Conditions of Tender and you will be deemed to have made allowance necessary to provide for these amendments in your Tender offer.

Tenderers are to note that the **closing date** for this tender has been **extended** to **2 August 2024** at **10:00**.

Please see the link below to access the supporting documents (i.e., Appendices) to Addendum No. 3 for the above-mentioned tender. The Dropbox link is accessible through the button below:

Addendum No.03 Enclosures

Or this link:

https://www.dropbox.com/scl/fo/gzh3n4db2jjb6fbpw6nkx/APy8WYIAleb0Hlm8sAYlill?rlkey=hsml8z3uagxm8icby3z8pdbp8&st=0s5rc6xk&dl=0

Tenderers are to return a signed copy of this notice/addendum with the submission of their Tender. Failure to return a signed copy of the Addendum may result in the Tender being declared non-Responsive.

Yours faithfully,

[redacted]

.....

Director: Supply Chain Management

ADDENDUM No. 3

ACKNOWLEDGEMENT OF RECEIPT FOR AND ON BEHALF OF THE TENDERER: TENDER No. 191Q/2023/24

At.....on this.....Day of 2024

Signature:.....

Name of Signatory:.....
(in ink and capitals)

TENDERER:.....
(Name of firm in ink and capitals)

CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

FINANCE
SUPPLY CHAIN MANAGEMENT

Supply Chain Management
Email: SCM.Tenders9@capetown.gov.za

29 July 2024

NOTICE TO TENDERERS NO: 4

Pages 3

TENDER NUMBER: **191Q/2023/24**

DESCRIPTION: **DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION FOR THE MACASSAR WASTEWATER TREATMENT WORKS**

CLOSING DATE: **02 August 2024**

BOX NUMBER: **121**

Dear Sir/Madam

Your attention is specifically drawn to the following amendments which are to be made to the Tender Document for the above tender, in terms of tender clause C3.2 of the Standard Conditions of Tender and you will be deemed to have made allowance necessary to provide for these amendments in your Tender offer.

Tenderers should take note of the following:

ADDENDUM NO 4 TO TENDER DOCUMENTS

ATD4-1 **SCHEDULE (BILL) OF QUANTITIES**

ATD4-1.1 **Volume 2: Returnable Documents, Part T2: Returnable Documents – C2.2 Schedule of Quantities**

ATD4-1.1.1 Bill M13 CHLORINE BUILDING, Bill M15 COMPRESSED AIR SYSTEMS (INSTRUMENT AIR), Bill M32 VENTILATION SYSTEMS, Bill E8 LV CABLES and Bill E9 CABLE SUPPORTS. Add the next line-item number to each of the Item number that contains the short description of *"All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify)"*

ATD4-1.1.2 Bill M14 CHEMICAL DOSING EQUIPMENT, Bill E13 INSTRUMENTATION AND FIELDBUS CABLES, and Bill E14 MEASURING INSTRUMENTS. Add the flowing to the each of the bills making sure that the next item number is used in each of the respective bills. Bill M14 is shown as an example.

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
M14-32		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant *(Specify)*	Item			

ATD4-1.1.3 Bill M35 PROCESS CONTROL ASSISTANCE, MAINTENANCE AND TRAINING (FULL TIME), add item number M35-14a to the line that has short description of *"Other general expenses incurred in complying with the requirements of the Scope of Work not included above (specify):"*

ATD4-1.1.4 Bill E13 INSTRUMENTATION AND FIELDBUS CABLES

Change the quantities for the following items based on the table below:

Item Number	Previous Quantity	New Quantity
E13-70	16700	16950
E13-74	16100	16850
E13-80	600	850
E13-81	14000	14250
E13-210	650	666
E13-214	160	166
E13-220	45	61
E13-221	45	61
E13-364	16700	16950
E13-368	16100	16850
E13-374	600	850
E13-375	14000	14250

ATD4-1.1.5 Bill E14 MEASURING INSTRUMENTS, add item number E14-42a to the line that has short description of *"Proximity switches (EX)". For items 32 and 118, change the quantities from 31 to 39.*

ATD4-1.1.6 The total column for some Bill of Quantities from Addendum 3 were not calculating (Bill M24-13, E14-7, E14-37, E14-40, E14-42, E14-45, E14-46, E14-73, E14-81, E14-118, E14-124, E14-157, E14-166, etc). These has been corrected in a revised electronic copy of the Bill of Quantities issued as part of addendum 4 which can be found in **Appendix A.** Furthermore, provision has been made for descriptions to be added for the items with short description of *"All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify)"*

ATD4-1.1.7 An updated corrected version of the Bill of Quantities has been issued addressing all formula and rate issues. Tenderers are alerted to the unlocking of "Column G" in electronic versions (i.e., Microsoft Excel version) of the Bills of Quantities and Tenderers are to take due care in completing the Bills of Quantities correctly in accordance with relevant tender data clauses.

ATD4-2 RETURNABLE SCHEDULES

ATD4-2.1 Volume 2: Returnable Documents
Part T2: Returnable Documents – T2.2 Returnable Schedules

ATD4-2.1.1 Schedule 17, Datasheet Number No. DS-EE-0050: DIESEL POWERED GENERATOR SETS. Replace *"Tier 2"* with *"Fuel Optimised" for* line item 4.02.

See **Appendix B** for updated electronic copy of the Electrical Datasheet.

ATD4-3 ENGINEERING & MANAGEMENT

ATD4-3.1 Volume 3: Draft Contract
Part C3: Scope of Works – C3.2 Engineering

ATD4-3.1.1 Clause 3.2.5.10, Hazardous Area Classification Study. Replace the following:

From:

"Diesel generator rooms, fuel storage and management areas"

To:

"Fuel storage and management areas"

ATD4-4 **REVISED TENDER DRAWINGS**

ATD4-4.1 **Volume 4: Book of Drawings**

ATD4-4.1.1 Replace drawing 1001780-0000-DRG-ME-0057 Rev T0 - MFD Sludge Stream - Digesters
With drawing 1001780-0000-DRG-ME-0057 Rev T1-MFD Sludge Stream - Digesters. See ***Appendix C.***

Tenderers are to return a signed copy of this notice/addendum with the submission of their Tender. Failure to return a signed copy of the Addendum may result in the Tender being declared non-Responsive.

Yours faithfully,

[redacted]

.....

Fot Director: Supply Chain Management

ADDENDUM No. 4

ACKNOWLEDGEMENT OF RECEIPT FOR AND ON BEHALF OF THE TENDERER: TENDER No. 191Q/2023/24

At.....on this.....Day of 2024

Signature:.....

Name of Signatory:.....
(in ink and capitals)

TENDERER:.....
(Name of firm in ink and capitals)

Enclosures:

1) **Appendix A: Electronic Version of Bill of Quantities**
2) **Appendix B: Electronic Version of Electrical Datasheet**
3) **Appendix C: Drawing 1001780-0000-DRG-ME-0057 Rev T1-MFD Sludge Stream - Digesters**

CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

SUPPLY CHAIN MANAGEMENT

Email: SCM.Tenders9@capetown.gov.za

19 SEPTEMBER 2024

[redacted]

[redacted]

TENDER NO.: 191Q/2023/24
DESCRIPTION: DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS.

TENDER CLARIFICATION NO.1

The City of Cape Town (CCT) is currently evaluating the above tender, and in terms of clauses C.2.17 and C.3.10 of the Contract Document, please clarify the following items in order for the CCT to proceed with the evaluation of this Tender.

VOLUME 2: Returnable Documents
Part T2.2: Returnable Schedules
Schedule 9: Schedule of Work Experience of Tenderer

Schedule 9 of T2.2 Returnable Schedules, states, *"In the case of a joint venture, the nature of work and financial contribution must also be listed for the participating firms. The value of work of the participating firms must align with the valued stated on the taking over certificate or performance certificate. The values will be escalated to date of closure of this Tender process by the Employer/Employer's Representative using an escalation factor of 7.5% per annum."*

The tenderer has not provided information regarding the nature of the work completed as well as their financial contribution in the joint ventures for the following contracts:

1. Aeration Blower Replacement (1Q/2013/14)
2. Watari Water Treatment Works (MWR/WS/S/91/II/83)
3. New Tamburawa Water Works (KNWB/SEC/230/11/179)

The BEC requires that this information be provided for the listed contracts.

VOLUME 2: Returnable Documents
Part T2.2: Returnable Schedules
Schedule 9: Schedule of Work Experience of Tenderer

The tenderer has listed comparable projects with combined Mechanical and Electrical scope for both the Mechanical installation and Electrical installation contracts. The BEC requires that the tenderer clearly provides the value and nature of the works for the mechanical installation scope only, and likewise for the electrical installation scope only. The BEC requires that this information be provided for the following contracts:

1. Aeration Blower Replacement (1Q/2013/14)
2. Kwa Mashu Wastewater Treatment Works (WS6037)
3. Zandvliet Wastewater Treatment Works (85Q/2016/17)
4. Zandvliet Wastewater Treatment Works MBR (178Q/2016/17)

VOLUME 2: Returnable Documents
Part T2.2: Returnable Schedules
Schedule 11: Confirmation of Contractor Registration / Accreditation

NRS 040-3:2002:

a) Please confirm which member of the proposed team will be the responsible person(s) with relevant ORHVS certification, and provide proof of certification?
b) The Proposed Work Plan states site work and commissioning will be done under supervision of the site foreman which will be done in full compliance of specifications and regulations. Please confirm if all requirements of Detail Electrical Specification sub-clause 6.4 and sub-clause 7.13 and sub-clause 8.4 will be adhered to?

☐ Yes, we conform to the specification.
☐ No, we do not conform to the specification.

VOLUME 2: Returnable Documents
Part T2.2: Returnable Schedules
Schedule 28: Technical Data Sheets

After conducting a review of the information provided, the BEC noted that items offered by the tenderer vary from the standard and detailed specification as listed in **Table 1** to **Table 3**. Some of the variations may be deemed unacceptable. The queries below (Table 1 to Table 3) provide an opportunity for the Tenderer to align the offered equipment with the project specifications. Failure to address these may lead to the tender being deemed non-responsive at the discretion of the CCT.

In the event that the tender is of the opinion that its offer does conform, or exceed the requirements of the specification, it shall motivate and substantiate this with reference material.

In instances where it cannot achieve the specification requirement, it shall motivate this accordingly.

Please tick the applicable box provided.

Table 1: *Mechanical Technical Data Sheets – Variations from Specification*

TD02	**Mechanical Front Rake Screens**
Item 5.5	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
Item 5.10	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
TD03	**Perforated Plate Belt Screens**
Item 7.2.4	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
TD06	**Hand Rake Screens: Fine screens**
Item 1.3	The Employer's agent has noted that the tenderer has duplicated the value from the coarse hand rake screen datasheet (i.e., 40 mm). Please confirm that TD06 is meant to be for the fine hand rake screen and therefore bar spacing offered is 25 mm and not 40 mm? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
TD07	**Wash Compactor: Inlet Works**
Item 7.2.4	Although not explicitly stated in the Detailed Mechanical Specifications, the Employer's agent views washer compactors as heavy shock application and shall therefore have a service factor of 2. Please confirm that the equipment offered conforms to Section 13 of the Detailed Mechanical Specification for heavy shock application (i.e., service factor of 2)? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
TD08	**Vortex Degritter Equipment**
Item 4.3	The tenderer has offered additional equipment to what is required for gravity grit extraction from the vortex degritters. Please confirm that no additional equipment will be offered in addition to the gravity extraction equipment. ☐ Yes, we conform to the specification and no additional equipment will be offered. ☐ No, we do not conform to the specification. See supporting documentation attached.

TD09	**Grit Classifier (with integrated washing)**
Item 5.5	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
TD10	**Skip Dolly**
Item 1.1	The tenderer has offered three (3) skip dollies on the technical datasheet and have priced for four (4) skip dollies on the Schedule of Quantities. Please confirm that the number of items on the datasheet is an error and that the tenderer's offer is for four (4) items as per Detailed Mechanical Specification and Schedule of Quantities? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
Item 2.2	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
Item 3.1	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
Item 5.1	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
Item 5.4	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
TD11	**Odour Control Equipment - Inlet Works**
Item 1.3	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.

Item 3.3	The Detailed Mechanical Specification called for minimum load on odour control covers of 500 kg/m^2 or 5 kN/m^2. Please confirm that the equipment offered will meet the specification. ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
Item 4.3	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
Item 4.4	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
TD12	**Odour Control Equipment - Gravity Thickener and Main Sludge Pump Station**
Item 1.3	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
Item 3.3	The Detailed Mechanical Specification called for minimum load on odour control covers of 500 kg/m^2 or 5 kN/m^2. Please confirm that the equipment offered will meet the specification. ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
Item 4.3	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
Item 4.4	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
TD14	**Vertical Shaft Mixers: Emergency Tank**
General	The tenderer has indicated "Not Required" for supplied equipment under TD14. However, all these items are required and have been priced in the Schedule of Quantities in line with the Detailed Mechanical Speciation. Please provide a breakdown of all the tenderer's vertical shaft mixers offered under this tender (including the location and number of mixers per location).

TD18	**Primary Settling Tank**
Item 5.4	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
Item 5.8	The tenderer has supplied the output speed of the gearbox in rpm. Please convert the speed to bridge peripheral speed in m/s: _____ m/s.
TD19	**Secondary Settling Tank**
Item 5.4	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
Item 5.8	The tenderer has supplied the output speed of the gearbox in rpm. Please convert the speed to bridge peripheral speed in m/s: _____ m/s.
TD21	**Mechanical Screens at UV Facility**
Item 4.3	The tenderer has offered "blower fan" as means of screenings dislodging. Please provide explanation on how this system works. A brochure is also acceptable.
Item 5.1.4	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
Item 5.1.5	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
TD22	**Odour Control Equipment - Dewatering**
Item 4.3	The Detailed Mechanical Specification called for minimum load on odour control covers of 500 kg/m^2 or 5 kN/m^2. Please confirm that the equipment offered will meet the specification. ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
Item 4.4	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.

TD23	**Fine Bubble Diffused Aeration Equipment**
Item 4.2	The tenderer's information regarding the airflow values (in Nm3/h) provided is not clear. Please confirm by checking the correct box below whether the values provided are per reactor or for the full FBDA installation. ☐ Per reactor ☐ Full installation
Item 6.3.6	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
TD30	**Digested Sludge Recirculation Pumps**
General	The tenderer's information regarding the Digested Sludge Recirculation Pumps provided is not clear. Please provide a brief description of the pumps (i.e. to which system do they belong, how they are configured, and how they operate).
TD39	**Primary Sludge Belt Presses**
Item 7.1.4	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
TD40	**WAS Linear Screens**
Item 2.2	The tender has offered a linear screen with a solids loading capacity of 3230-5721 kgDS/d. This seems high and is possibly a decimal error. Please confirm that this value is correct. ☐ Yes, this value is correct. ☐ No, this value is not correct. If no, please provide actual solids loading. _____ kgDS/d.
Item 7.4	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.

TD41	WAS Belt Presses
Item 2.2	The tender has offered a linear screen with a solids loading capacity of 3230-5721 kgDS/d. This seems high and is possibly a decimal error. Please confirm that this value is correct. ☐ Yes, this value is correct. ☐ No, this value is not correct. If no, please provide actual solids loading. _____ kgDS/d.
Item 7.4	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.

TD42	Primary Sludge Horizontal Screw Conveyor
Item 2.2	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
Item 3.1	The tenderer has offered "Thermal Overload" for over torque protection. Please provide a brief description of how this system works.
Item 5.1	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.

TD43	WAS Horizontal Screw Conveyor
Item 3.1	The tenderer has offered "Thermal Overload" for over torque protection. Please provide a brief description of how this system works.
Item 5.1	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.

TD44	Live Bottom Screw Conveyor (Primary Sludge Silos)
Item 2.2	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.

Item 5.1	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
Item 7.5	The tenderer has offered "Thermal Overload" for over torque protection. Please provide a brief description of how this system works.
TD45	**Live Bottom Screw Conveyor (WAS Silos)**
Item 2.2	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
Item 5.1	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
Item 7.5	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
TD61	**Lifting Equipment for A and R Recycle Pump Station**
Item 2.1	The tenderer's offer varies from the Detailed Mechanical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.

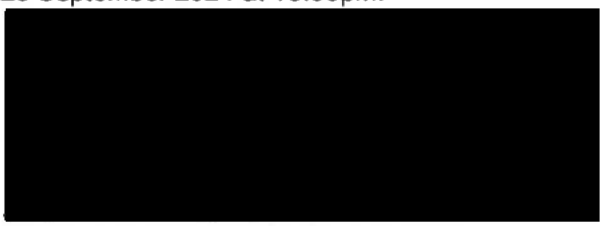
Table 2: *Electrical Technical Data Sheets – Variations from Specification*

DS-EE-0050	**Diesel Powered Generators**
Item 12.08	The tenderer's offer varies from the Detailed Electrical Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.
DS-EP-0007	**NERCT**
1.01 - 1.03	Please clarify details of make and model.

Table 3: *Electronic Technical Data Sheets – Variations from Specification*

DS-II-0003	**SCADA**
Item 9.13	The tenderer's offer varies from the Detailed Electronic Specification. Please confirm that the equipment offered will meet the specification? ☐ Yes, we conform to the specification. ☐ No, we do not conform to the specification. See supporting documentation attached.

Please submit your response as requested to SCM.Tenders9@capetown.gov.za by no later than Wednesday, 25 September 2024 at 15:00pm.



Director: Supply Chain Management

City of Cape Town
Supply Chain Management
SCM.Tenders9@capetown.gov.za

25 September 2024

TENDER NO.: 191Q/2023/24
DESCRIPTION: DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS.

TENDER CLARIFICATION NO.1

Dear Sir,

With reference to your letter dated 19 September 2024, please find herewith our response as follows:

Schedule 9: Schedule of work experience of tenderer

1. Aeration Blower Replacement (1Q/2013/14):

IAE JV:	Nature of work	Financial Contribution
I = Inenzo Water	Mechanical & Electrical LV	88.3%
A = Adenco	Electrical MV	5.6%
E = Exeo	Civils	6.1%
		100.0%

2. Watari Water Treatment Works (MWR/WS/S/91/II/83):

PCI Africa-Constain Joint Venture	Nature of Work	Financial Contribution
PCI Africa	Mechanical, electrical and automation	31.9%
Constain (West Africa) Plc	Civil	68.1%
		100.0%

3. New Tamburawa Water Works (KNWB/SEC/230/11/179):

PCI Africa-Constain Joint Venture	Nature of Work	Financial Contribution
PCI Africa	Mechanical, electrical and automation	49.5%
Constain (West Africa) Plc	Civil	50.5%
		100.0%

[redacted]

Schedule 9: Schedule of work experience of tenderer

1. Aeration Blower Replacement (1Q/2013/14)

Nature of Work	Value of the Work	Escalated Value
Electrical portion of the work	70 197 467	125 195 627
Mecanical Portion of the work	76 463 692	136 371 299
	146 661 159	261 566 926

2. Kwa Mashu Wastewater Treatment Works (WS6037):

Nature of Work	Value of the Work	Escalated Value
Electrical portion of the Work	67 710 791	129 817 747
Mechanical portion of the Work	78 495 170	150 493 975
	146 205 962	280 311 723

3. Zandvliet Wastewater Treatment Works (85Q/2016/17):

Nature of Work	Value of the Work	Escalated Value
Electrical portion of the Work	106 176 310	122 699 999
Mechanical portion of the Work	255 874 473	295 694 937
	362 050 783	418 394 936

4. Zandvliet Wastewater Treatment Works MBR (178Q/2016/17):

Nature of Work	Value of the Work	Escalated Value
Electrical portion of the Work	121 618 548	130 739 939
Mechanical portion of the Work	353 144 010	379 629 811
	474 762 558	510 369 750

Final payment certificates were submitted with our tender submission.

NRS 040-3:2002:

a) The responsible person is Mr. Jacques Bornman ID no 9208145100087, please find proof of certification attached.

b) We confirm that all the requirements of the detailed electrical specification sub-clause 6.4, sub-clause 7.13 and sub-clause 8.4 will be adhered to.

[redacted]

Table 1: Mechanical Technical Datasheets

TD02	**Mechanical Front Rake Screens**
Item 5.5	Yes, we conform to the specification
Item 5.10	Yes, we conform to the specification
TD03	**Perforated Plate Belt Screens**
Item 7.2.4	Yes, we conform to the specification. The tenderer will ensure during detail design phase that the gearbox selection does comply with the specified service factor.
TD06	**Hand Rake Screens: Fine Screens**
Item 1.3	Yes, we conform to the specification. TD06 is meant for the fine hand rake screen and therefore bar spacing offered is 25mm and not 40mm
TD07	**Washer Compactor: Inlet Works**
Item 7.2.4	Yes, we conform to the specification. The equipment offered conforms to section 13 of the Detailed Mechanical Specification for Heavy Shock Application (i.e., service factor of 2)
TD08	**Vortex Degritter Equipment**
Item 4.3	Yes, we conform to the specification
TD09	**Grit Classifier (With integrated washing)**
Item 5.5	Yes, we conform to the specification
TD10	**Skip Dolly**
Item 1.1	Yes, we conform to the specification. The number of items on the Datasheet is an error and the tendered offer is for four (4) items as per Detailed Mechanical Specification and Schedule of Quantities
Item 2.2	Yes, we conform to the specification
Item 3.1	Yes, we conform to the specification
Item 5.1	Yes, we conform to the specification
Item 5.4	Yes, we conform to the specification
TD11	**Odour Control Equipment – Inlet Works**
Item 1.3	Yes, we conform to the specification
Item 3.3	Yes, we conform to the specification
Item 4.3	Yes, we conform to the specification
Item 4.4	Yes, we conform to the specification

[redacted]

TD12	Odour Control Equipment – Gravity Thickener and Main Sludge Pump Station
Item 1.3	Yes, we conform to the specification
Item 3.3	Yes, we conform to the specification
Item 4.3	Yes, we conform to the specification
Item 4.4	Yes, we conform to the specification
TD14	**Vertical Shaft Mixers: Emergency Tank**
General	The tenderer has correctly priced for **ALL** the mixers as specified and indicated in the bill of quantities, but erroneously indicated in the TD 'Not required". Attached, please find the TD for the **Vertical Shaft Mixers: Emergency Tank** as tendered/specified.
TD18	**Primary Settling Tank**
Item 5.4	Yes, we conform to the specification. The tenderer will ensure during detail design phase that the gearbox selection does comply with the specified service factor of 2.5
Item 5.8	Please note your request to have the bridge peripheral speed in m/s seems to be a typo? It is assumed you meant to ask for it in m/min. Our TD indicate 223rpm - this is a typo. It was meant to be 2.23rpm x 0.3m diameter x 3.14 (PI) = 2.1m/min which is slightly above the 1.5m/min to 2.0m/min specified. The tenderer will ensure during detail design phase that the final gearbox selection does comply with the 1.5m/min to 2.0m/min specified.
TD19	**Secondary Settling Tank**
Item 5.4	Yes, we conform to the specification. The tenderer will ensure during detail design phase that the gearbox selection does comply with the specified service factor of 2.5
Item 5.8	Please note your request to have the bridge peripheral speed in m/s seems to be a typo? It is assumed you meant to ask for it in m/min. Our TD indicate 223rpm - this is a typo. It was meant to be 2.23rpm x 0.3m diameter x 3.14 (PI) = 2.1m/min which is slightly above the 1.5m/min to 2.0m/min specified. The tenderer will ensure during detail design phase that the final gearbox selection does comply with the 1.5m/min to 2.0m/min specified.

[redacted]

TD21	Mechanical Screens at UV Facility
Item 4.3	Explanation: The air is blown onto the screenfield (upstream of the screen), The air discharge arrangement is strategically designed, constructed, and positioned to effortless lift screenings off the screenfield and up into the screw conveyor trough. The blown air and the scraper arm are the method of dislodging the waste debris, into the shoot, from where it is taken away by the screw conveyor. The blower box, manufactured into the screen frame, dislodges any leftover debris (after the scraper has fulfilled its function), and debris falls into the shoot, This allows for a clean rake as well as a clean chain, continuously and at all times, to prevent anything from damaging the screen. The blower box will blow at a high speed onto each rake and chain to ensure any debris are removed and blown into the shoot. The blower box is angled down directly into the shoot. Please see attached the pictures / drawings for reverence. Page 11 to 15 is relevant. These screens are successfully working at the City of Cape Town Fisantekraal WWTW, Bellville WWTW and Potsdam WWTW on the final effluent. Bellville has the scraper and blower combo where the others are only working with the blower. Bellville is the best example as to how a Macassar design may look like. Bonnievale and Robertson WWTW's also use these screens. • Please refer to the attached drawing, and supplier catalogue
Item 5.1.4	Yes, we will conform to the specification: Spec: The frame, screen field, chains, sprockets, chutes and covers shall be made of 316 stainless steel. The product offered will be 100% SS316L, fully compliant with the specification
Item 5.1.5	Yes, we will conform to the specification: Spec: The frame, screen field, chains, sprockets, chutes and covers shall be made of 316 stainless steel. The product offered will be 100% SS316L, fully compliant with the specification
TD22	**Odour Control Equipment – Dewatering**
Item 4.3	Yes, we conform to the specification
Item 4.4	Yes, we conform to the specification

[redacted]

<table>
<tr><th>TD23</th><th>Fine Bubble Diffused Aeration Equipment</th></tr>
<tr><td>Item 4.2</td><td>
The airflow in our TD is for the <u>full installation</u>, i.e. total FBDA system (All 4 Reactors)

For clarity, please find table below to indicate <u>Total per basin</u> and <u>Total for the full installation:</u>
<table>
<tr><th></th><th colspan="3"><u>Design Stage</u></th><th colspan="3"><u>Commissioning Stage</u></th></tr>
<tr><th></th><th>Maximum</th><th>Average</th><th>Minimum</th><th>Maximum</th><th>Average</th><th>Minimum</th></tr>
<tr><td>Zone 1</td><td>5507</td><td>4306</td><td>1911</td><td>3138</td><td>2457</td><td>1074</td></tr>
<tr><td>Zone 2</td><td>4438</td><td>3470</td><td>1529</td><td>2618</td><td>2046</td><td>1008</td></tr>
<tr><td>Zone 3</td><td>3354</td><td>2621</td><td>1201</td><td>2000</td><td>1568</td><td>1008</td></tr>
<tr><td>Total / Basin</td><td>13299</td><td>10397</td><td>4641</td><td>7756</td><td>6071</td><td>3090</td></tr>
<tr><td>No. Of Basins</td><td>4</td><td>4</td><td>4</td><td>4</td><td>4</td><td>4</td></tr>
<tr><td>Total</td><td>53196</td><td>41588</td><td>18564</td><td>31024</td><td>24284</td><td>12360</td></tr>
</table>
</td></tr>
<tr><td>Item 6.3.6</td><td>Yes, we conform to the specification.</td></tr>
</table>

[redacted]

TD30	Digested Sludge Recirculation Pumps

General

Response to tender clarification

TD30	Digested Sludge Recirculation Pumps
General	The tenderer's information regarding the Digested Sludge Recirculation Pumps provided is not clear. Please provide a brief description of the pumps (i.e. to which system do they belong, how they are configured, and how they operate).

Specification M50 - Sludge Heating Equipment requires 2 hot sludge pumps, and P&ID MM-0058 indicates that both pumps will be duty pumps. This is illustrated below in extracts from the aforementioned specification and drawing:

50.1 **Scope**

The Contractor shall design, supply, deliver, install, test, commission and uphold during the Trial Operation and Defects Liability Periods all the sludge heating equipment, ancillary components and associated control systems required to achieve and maintain mesophilic conditions inside the anaerobic digesters. This shall include, but not be limited to, the following systems and equipment.

a) Two (2) Sludge heat exchangers.

b) Two (2) Hot sludge pumps (sludge recirculation)

SLUDGE STREAM				
EQUIPMENT	BOILERS	BOILER FEED WATER PUMPS	HEAT EXCHANGERS	SLUDGE RECIRCULATION PUMPS
DUTY	2	2	2	2
STANDBY	0	0	0	0
STARTER TYPE	N/A	VSD	N/A	VSD
FLOW RATE (l/s)				
HEAD (m)				

Accordingly, we have allowed for two hot sludge recirculation pumps that extract sludge from the digestors, pump it through the sludge heat exchangers, and then back into the digestors.

The confusion may be arising from the method of completion of the technical datasheet "TD30_Digested Sludge Recirculation Pumps" in which an option was provided for both Vaughan pumps, and Landia pumps. For clarity, the two options have now been separated into two datasheets, one for each make of pump.

[redacted]

TD39	**Primary Sludge Belt Presses**
Item 7.1.4	Yes, we conform to the specification. The tenderer will ensure during detail design phase that the gearbox selection does comply with the specified service factor.
TD40	**WAS Linear Screens**
Item 2.2	Yes, this value is correct. The performance requirements of the WAS linear Screens indicate a Solids Loading rate of 40 050 kg DS/d. 40 050 split between the 7 duty units is 5721 kg DS/d per machine. This is in line with our offer.
Item 7.4	Yes, we conform to the specification. The tenderer will ensure during detail design phase that the gearbox selection does comply with the specified service factor.
TD41	**WAS Belt Presses**
Item 2.2	Yes, this value is correct. The performance requirements of the WAS linear Screens indicate a Solids Loading rate of 40 050 kg DS/d. 40 050 split between the 7 duty units is 5721 kg DS/d per machine. This is in line with our offer.
Item 7.4	Yes, we conform to the specification. The tenderer will ensure during detail design phase that the gearbox selection does comply with the specified service factor.
TD42	**Primary Sludge Horizontal Screw Conveyor**
Item 2.2	Yes, we conform to the specification.
Item 3.1	The use of the term “Thermal Overload”, in this context is not correct. The thermal overload protection is being carried out by intelligent motor starters. We have allowed for additional voltage monitoring units on these intelligent motor starters which allow us to monitor the power/torque developed and can therefore trip the motor if there is a thermal overload scenario or if an over torque scenario presents itself. If this is not deemed satisfactory, we will then install field mounted proximity switches that would be hardwired into the starter to trip the units should the torque developed by the motor exceed its designed value.
Item 5.1	Yes, we conform to the specification.
TD43	**WAS Horizontal Screw Conveyor**
Item 3.1	The use of the term “Thermal Overload”, in this context is not correct. The thermal overload protection is being carried out by intelligent motor starters. We have allowed for additional voltage monitoring units on these intelligent motor starters which allow us to monitor the power/torque developed and can therefore trip the motor if there is a thermal overload scenario or if an over torque scenario presents itself. If this is not deemed satisfactory, we will then install field mounted proximity switches that would be hardwired into the starter to trip the units should the torque developed by the motor exceed its designed value.
Item 5.1	Yes, we conform to the specification.
TD44	**Live Bottom Screw Conveyor (Primary Sludge Silos)**
Item 2.2	Yes, we conform to the specification.
Item 5.1	Yes, we conform to the specification.
Item 7.5	Yes, we conform to the specification. The tenderer will ensure during detail design phase that the gearbox selection does comply with the specified service factor.

[redacted]

TD45	Live Bottom Screw Conveyor (WAS Silos)
Item 2.2	Yes, we conform to the specification.
Item 5.1	Yes, we conform to the specification.
Item 7.5	Yes, we conform to the specification. The tenderer will ensure during detail design phase that the gearbox selection does comply with the specified service factor.
TD61	**Lifting Equipment for A and R Recycle Pump Station**
Item 2.1	Yes, we will conform to the specification: We will design, supply, and install a 2 Ton system in lieu of the 1 Ton offered. The specification asks for the lifting equipment to be rated for the weight of the heaviest pump plus 50%. The heaviest pump between the A and R-recycle pumps is the A-recycle pump with a total weight of 1'100 kg each. The heaviest component is 300 kg, however, if a complete pump should be lifted in / out, the crane structure and design will be offered and supplied as 1.65 Ton (or even 2 Ton) without any problem.

Table 2: Electrical Technical Data Sheets

DS-EE-0050	Diesel Powered Generators
Item 12.08	Yes, we conform to the specification.
DS-EP-0007	**NERCT**
1.01	Free State Transformers
1.02	2024 Model
1.03	Republic of South Africa

Table 3: Electronic Technical Data Sheets

DS-II-0003	SCADA
Item 9.13	Yes, we conform to the specification.

Yours faithfully,

[redacted]

[redacted]

23 September 2024

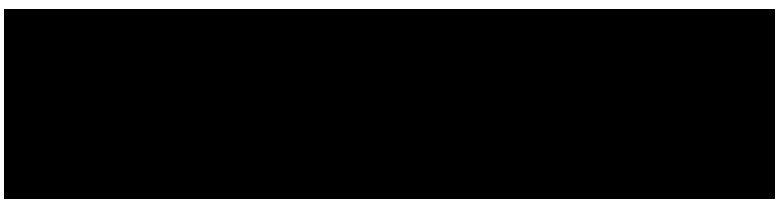
Your reference: Tender No 191Q/2023/24
City of Cape Town

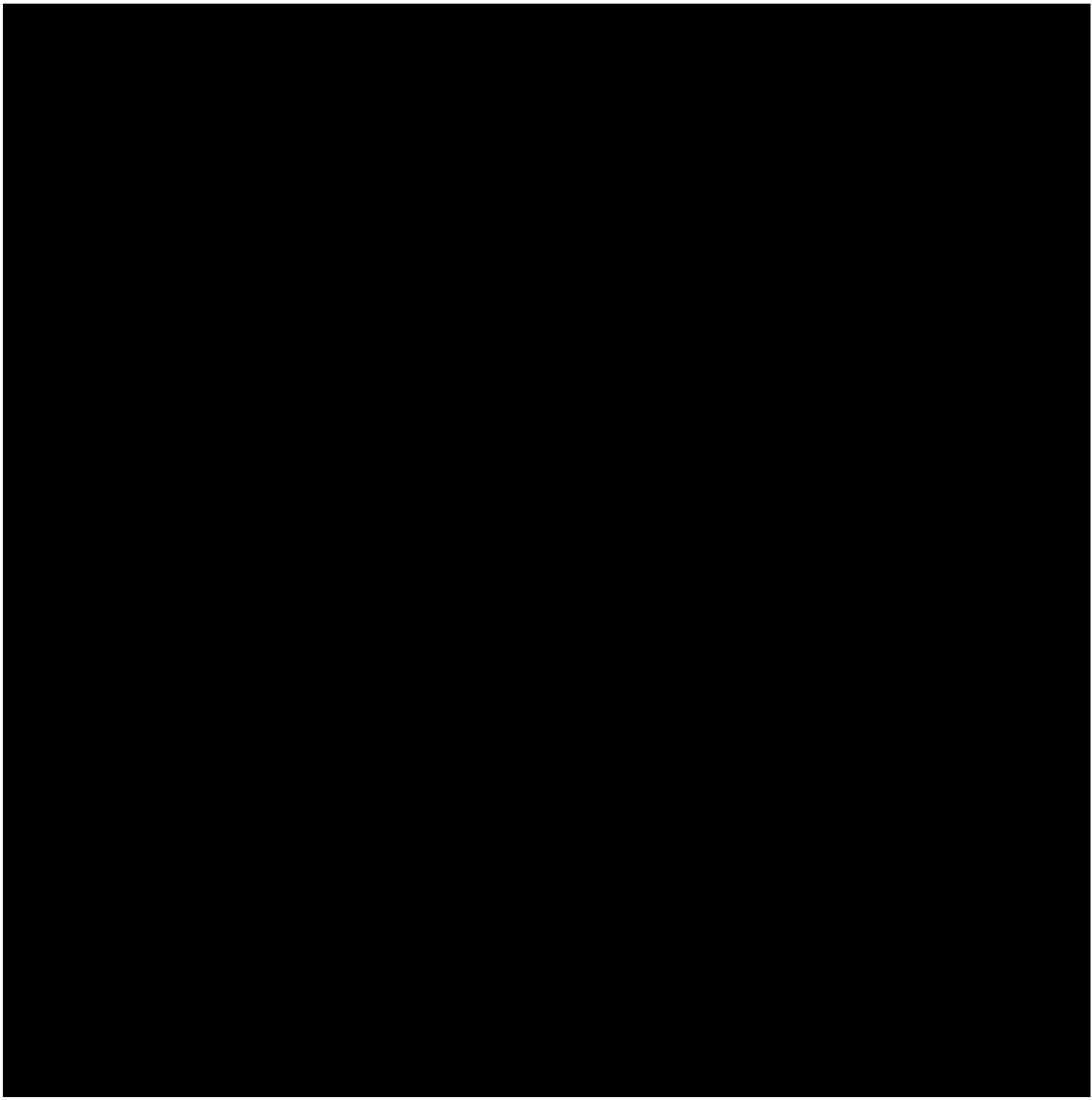
Reference: Tamburawa Water Treatment Works (KNWB/SEC/230/II/179)

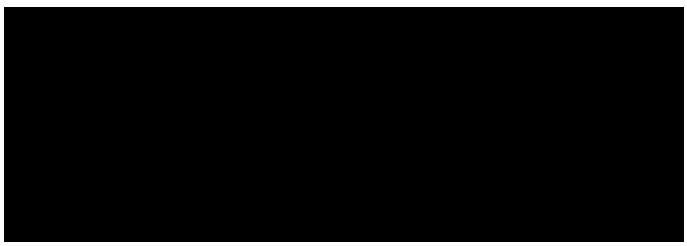
Clarification No 1: Supporting letter for the claiming of points for the Tamburawa Water Works (KNWB/SEC/230/II/179)

Tender Clarification No.1 in respect of Tender No 191Q/2023/24 has reference:

[redacted]







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DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS

191Q/2023/24

CLIENT Nº.

PAGE

ZUTARI Nº.

REV. T0

TD14: Vertical Shaft Mixers: Emergency Tank

Rev	TI	Descriptrion	By	Ckd	APP.	Aut.	Date
T0	D	TD14: Vertical Shaft Mixers: Emergency Tank	AH	MD	NH		MARCH 2024

Supplier: **Quantity:**

Item		Unit	Offered	
1	**GENERAL**		Balancing Tank (T1-T6)	Balancing Tank (T7-T8)
1.1	No. of units	text	6	17
1.2	Make and model	text	TELP 150/35/1 - 2100D	TELP 110/39/1 - 2150D
1.3	Country of manufacture	text	RSA	RSA
1.4	Spares address	text	27 Jan van Nickerk Str, Atlantis	
2	**PERFORMANCE REQUIREMENTS**			
2.1	Mixing performance details	text	210 m³/min	240 m³/min
2.2	Maximum solids consistency capability	%	10	10
2.3	Power demand at maximum duty point	kW	6	9,1
2.4	Mixing thrust produced	N		
3	**CONSTRUCTION AND DESIGN**			
3.1	Impeller type and design	text	Axial Flow - down Thrust	Axial Flow - down Thrust
3.2	Operating speed range	rpm	35	39
4	**MATERIALS AND COATINGS**			
4.1	Material of impeller	text	316 S/S	316 S/S
4.2	Material of shaft	text	316 S/S	316 S/S
5	**MOTORS**			
5.1	Make	text	SEW	SEW
5.2	Model	text	DRN 132 M4	DRN 160 M4
5.3	Nameplate power	kW	7,5	11
5.4	Voltage	V	400	400
5.5	Rated load current	Amps	14,2	20,9
5.6	Frequency	Hz	50	50
5.7	Phase	Ph.	3	3
5.8	Ingress Protection	IP	66	66
5.9	Weight	kg	75	125
6	**GEARBOXES**			

6.1	Make	text	SEW	SEW
6.2	Model	text	RF127	RF137
6.3	Gearbox type	text	Inline Helical	Inline Helical
6.4	Gearbox service factor	text	2.9	2.9
6.5	Power	kW	7.5	11
6.6	Torque	Nm	3000	2693
6.7	Input speed (N_1)	rpm	1460	1440
6.8	Output speed (N_1)	rpm	35	39
6.9	Ratio	-	41.7 : 1	36.9 : 1
6.10	Weight	kg	220	235
7	**WEIGHT AND DIMENSIONS**			
7.1	Impeller diameter	mm	2100	2150
7.2	Minimum Impeller / column clearance	mm	350	350
7.3	Minimum impeller submergence required	mm	3220	3220

Regardless of any information provided in this technical detail sheet, the equipment to be provided will comply with the specified requirements.

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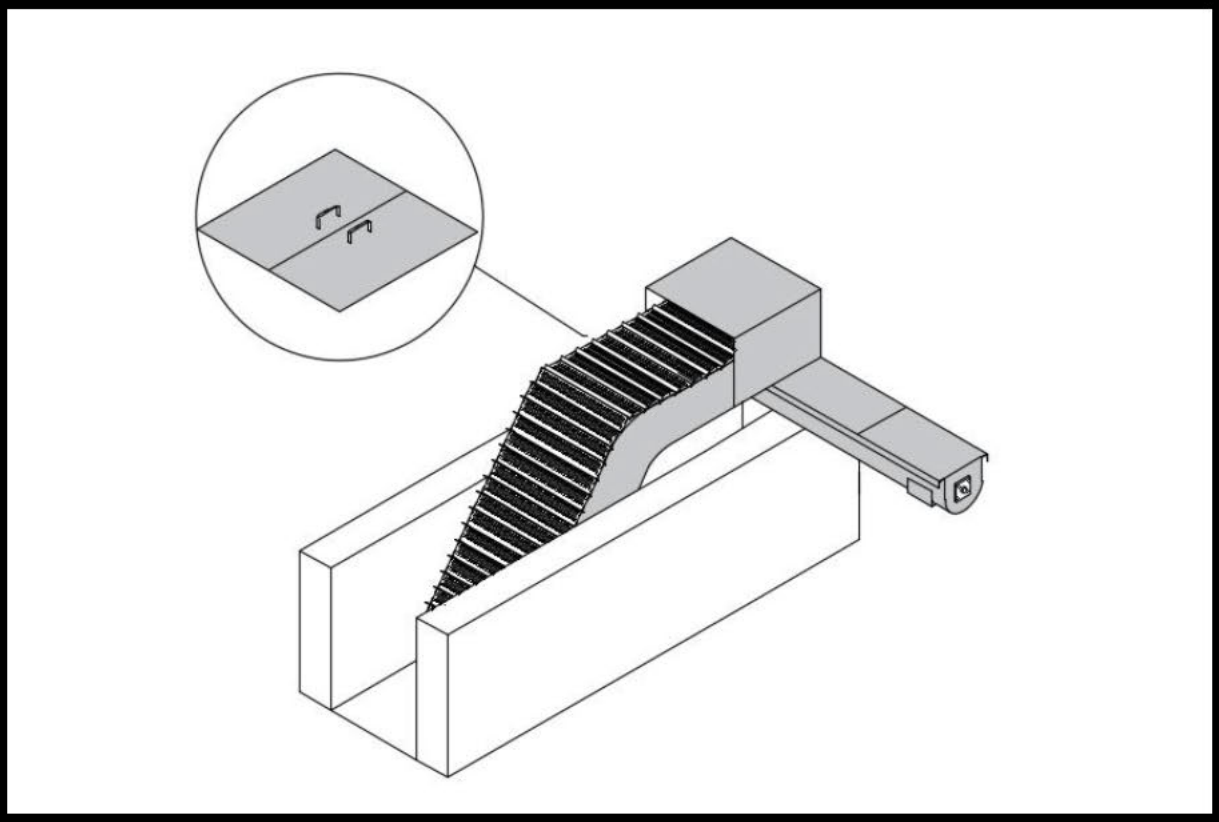
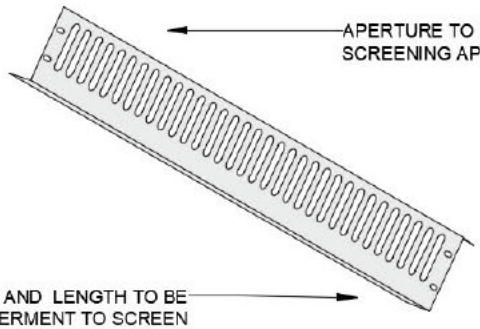
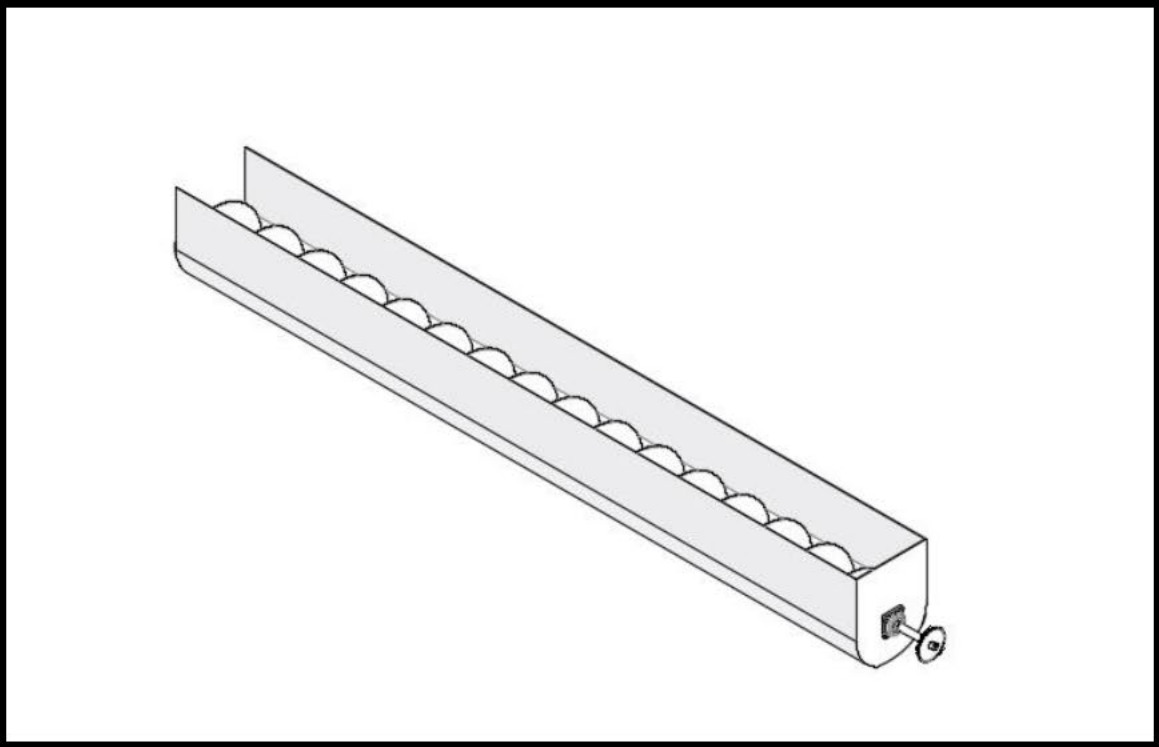



APERTURE TO BE DETERMINED IN ACCORDANCE TO THE SCREENING APPLICATION
LIP GRADIENT AND LENGTH TO BE DETERMENT TO SCREEN GRADIENT AND APPLICATION



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DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS

191Q/2023/24

TD30: Digested Sludge Recirculation Pumps

CLIENT N°.	PAGE
ZUTARI N°.	REV. T0

Rev.	TI	Descriptrion	By	Ckd	APP.	Aut.	Date
T0	D	TD30: Digested Sludge Recirculation Pumps	AH	MD	NH		MARCH 2024

Supplier: **Quantity:**

Item		Unit	Offered
1	**GENERAL**		
1.1	Number of pumps	No.	2
1.2	Make	text	Vaughan Chopper Pump
1.3	Model	text	HE4T6CS-115
1.4	Country of manufacture	text	USA
1.5	Spares supplier and address	text	WEC Projects - 15 William Nicol Dr, Diepsloot A/H, RSA
2	**PERFORMANCE REQUIREMENTS**		
2.1	Shut-off head	m	12.7m
2.2	Flowrate at duty point (for water)	ℓ/s	27.78 l/s
2.3	Head at duty point (for water)	m	10.7m
2.4	Flow range (min - max)	ℓ/s to ℓ/s	13.88 l/s to 50.47 l/s
2.5	Efficiency at duty point	%	58%
2.6	Best efficiency point	%	62.3%
2.7	NPSHrequired at duty point (absolute pressure)	m	-
3	**CONSTRUCTION AND DESIGN**		
3.1	Pump type and description	text	Centrifugal Chopper Pump
3.2	Maximum diameter of solid object that can be pumped	mm	120mm
3.3	Pump seal type and description	text	Cartridge type with stainless steel housing, integral stainless steel shaft sleeve and tungsten carbide faces
3.4	Description of impeller	text	Impeller, Cutter Bar, Cutter Nut and Upper Cutter, cast steel, heat treated to minimum Rockwell C60.
3.5	Design includes cutter for stringy materials	Yes / no	Yes
3.6	Description of cutter (if applicable)	text	Impeller, Cutter Bar, Cutter Nut and Upper Cutter, cast steel, heat treated to minimum Rockwell C60.
3.7	Flange drilling	text	4" discharge & 6" inlet, ANSI Class 125
3.8	Description of couplings	text	Elastomeric type by TB Woods
4	**MATERIALS AND COATINGS**		
4.1	Pump casing	text	Cast ductile iron
4.2	Impeller	text	Cast steel, heat treated to minimum Rockwell C60
4.3	Cutter	text	Cast steel, heat treated to minimum Rockwell C60

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DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS

191Q/2023/24

TD30: Digested Sludge Recirculation Pumps

CLIENT Nº. | PAGE

ZUTARI Nº. | REV. T0

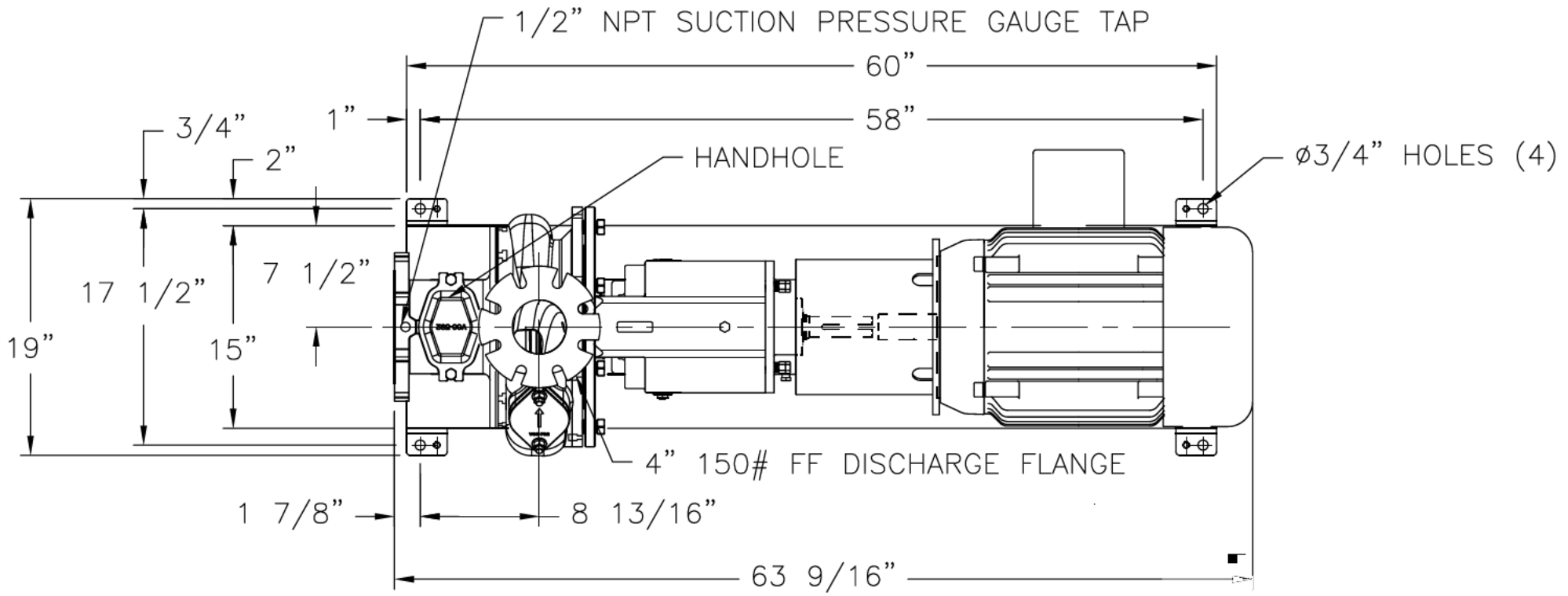
Rev.	TI	Descriptrion	By	Ckd	APP.	Aut.	Date
T0	D	TD30: Digested Sludge Recirculation Pumps	AH	MD	NH		MARCH 2024

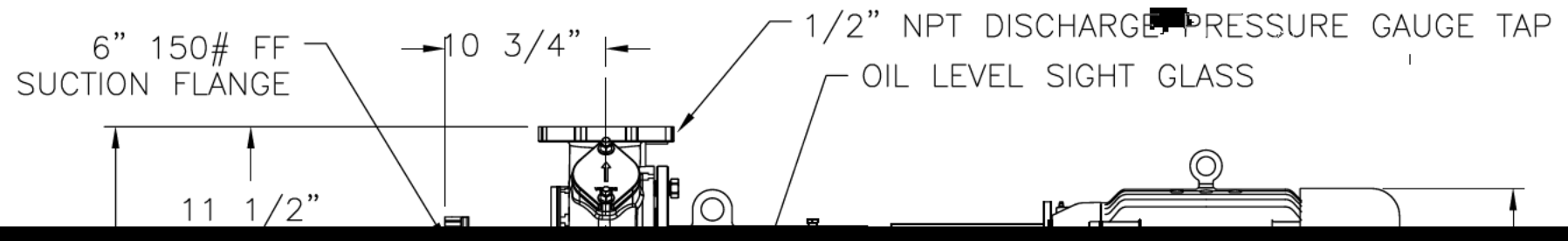
Supplier: **Quantity:**

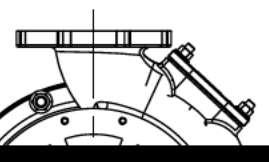
Item		Unit	Offered
4	**MATERIALS AND COATINGS (CONTINUED)**		
4.4	Shaft	text	Heat treated steel supported by rolling element bearings
4.5	Wear ring (or equivalent)	text	Short Shaft Overhang supported with oversized trust & radial back to back heat treated steel rolling element bearings
4.6	Seal Material	text	Cartridge type with stainless steel housing, integral stainless steel shaft sleeve, and tungsten carbide faces
4.7	Base frame	text	Powder coated steel complete with lifting eyes and anchor bolt holes
4.8	Exterior coating	text	Solvent wash, sandblast and coat with minimum 30 MDFT Tnemec Perma-Shield PL Series 431 epoxy
5	**MOTORS**		
5.1	Make	text	WEG
5.2	Model	text	ATEX Zone 2 premium efficient
5.3	Nameplate power	kW	7.5kW
5.4	Voltage	V	400V
5.5	Rated load current	Amps	14.8
5.6	Frequency	Hz	50Hz
5.7	Phase	Ph.	3Ph
5.8	Ingress Protection	IP	IP66
5.9	Weight	kg	118kg
6	**WEIGHT AND DIMENSIONS**		
6.1	Mass (empty pump)	kg	210.47kg
6.2	Impeller diameter	mm	292mm
6.3	Inlet diameter	DN	DN150
6.4	Outlet diameter	DN	DN100

Regardless of any information provided in this technical detail sheet, the equipment to be provided will comply with the specified requirements.

Name (Print): _____ ***Signature:*** _____


1/2" NPT SUCTION PRESSURE GAUGE TAP
60"
58"
1"
3/4"
2"
HANDHOLE
Ø3/4" HOLES (4)
19"
17 1/2"
7 1/2"
15"
4" 150# FF DISCHARGE FLANGE
1 7/8"
8 13/16"
63 9/16"


6" 150# FF
SUCTION FLANGE
10 3/4"
1/2" NPT DISCHARGE PRESSURE GAUGE TAP
OIL LEVEL SIGHT GLASS
11 1/2"



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DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS

191Q/2023/24

CLIENT Nº. | PAGE

TD30: Digested Sludge Recirculation Pumps

ZUTARI Nº. | REV. T0

Rev.	TI	Descriptrion	By	Ckd	APP.	Aut.	Date
T0	D	TD30: Digested Sludge Recirculation Pumps	AH	MD	NH		MARCH 2024

Supplier: **Quantity:**

Item		Unit	Offered
1	**GENERAL**		
1.1	Number of pumps	No.	2
1.2	Make	text	LANDIA
1.3	Model	text	MPTK-I 80
1.4	Country of manufacture	text	DENMARK
1.5	Spares supplier and address	text	WEC Projects - 15 William Nicol Dr, Diepsloot A/H, RSA
2	**PERFORMANCE REQUIREMENTS**		
2.1	Shut-off head	m	12.7m
2.2	Flowrate at duty point (for water)	ℓ/s	27.78 l/s
2.3	Head at duty point (for water)	m	4.58m
2.4	Flow range (min - max)	ℓ/s to ℓ/s	0 to 125l/s
2.5	Efficiency at duty point	%	28.4%
2.6	Best efficiency point	%	39.1%
2.7	NPSHrequired at duty point (absolute pressure)	m	1m
3	**CONSTRUCTION AND DESIGN**		
3.1	Pump type and description	text	Centrifugal Chopper Pump
3.2	Maximum diameter of solid object that can be pumped	mm	50mm
3.3	Pump seal type and description	text	Mechanical - 2 pieces
3.4	Description of impeller	text	open, clog free
3.5	Design includes cutter for stringy materials	Yes / no	Yes
3.6	Description of cutter (if applicable)	text	External in front of pump
3.7	Flange drilling	text	
3.8	Description of couplings	text	No coupling
4	**MATERIALS AND COATINGS**		
4.1	Pump casing	text	EN-0JL-250
4.2	Impeller	text	EN-0JL-250
4.3	Cutter	text	W1.0038/S235JR

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DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS

191Q/2023/24

TD30: Digested Sludge Recirculation Pumps

CLIENT N°.	PAGE
ZUTARI N°.	REV. T0

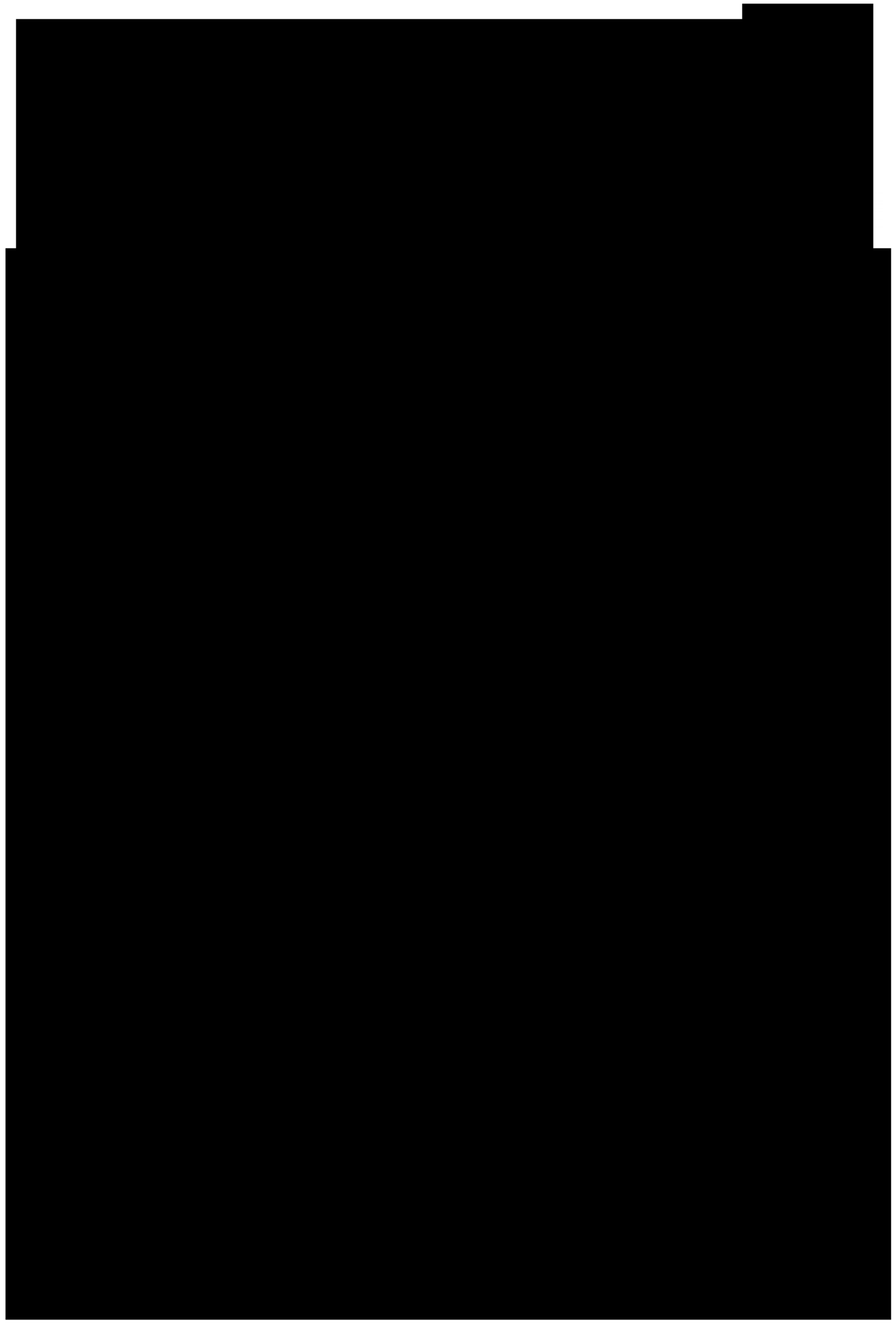
Rev.	TI	Descriptrion	By	Ckd	APP.	Aut.	Date
T0	D	TD30: Digested Sludge Recirculation Pumps	AH	MD	NH		MARCH 2024

Supplier: **Quantity:**

Item		Unit	Offered
4	**MATERIALS AND COATINGS (CONTINUED)**		
4.4	Shaft	text	W1.6582/AISI 4340
4.5	Wear ring (or equivalent)	text	None
4.6	Seal Material	text	SIC/SIC
4.7	Base frame	text	Galvanised steel
4.8	Exterior coating	text	Machine paint
5	**MOTORS**		
5.1	Make	text	Vem Germany
5.2	Model	text	
5.3	Nameplate power	kW	5.5kW
5.4	Voltage	V	400V
5.5	Rated load current	Amps	12.0A
5.6	Frequency	Hz	50Hz
5.7	Phase	Ph.	3Ph
5.8	Ingress Protection	IP	IP55
5.9	Weight	kg	
6	**WEIGHT AND DIMENSIONS**		
6.1	Mass (empty pump)	kg	155kg
6.2	Impeller diameter	mm	220mm
6.3	Inlet diameter	DN	DN150
6.4	Outlet diameter	DN	DN100

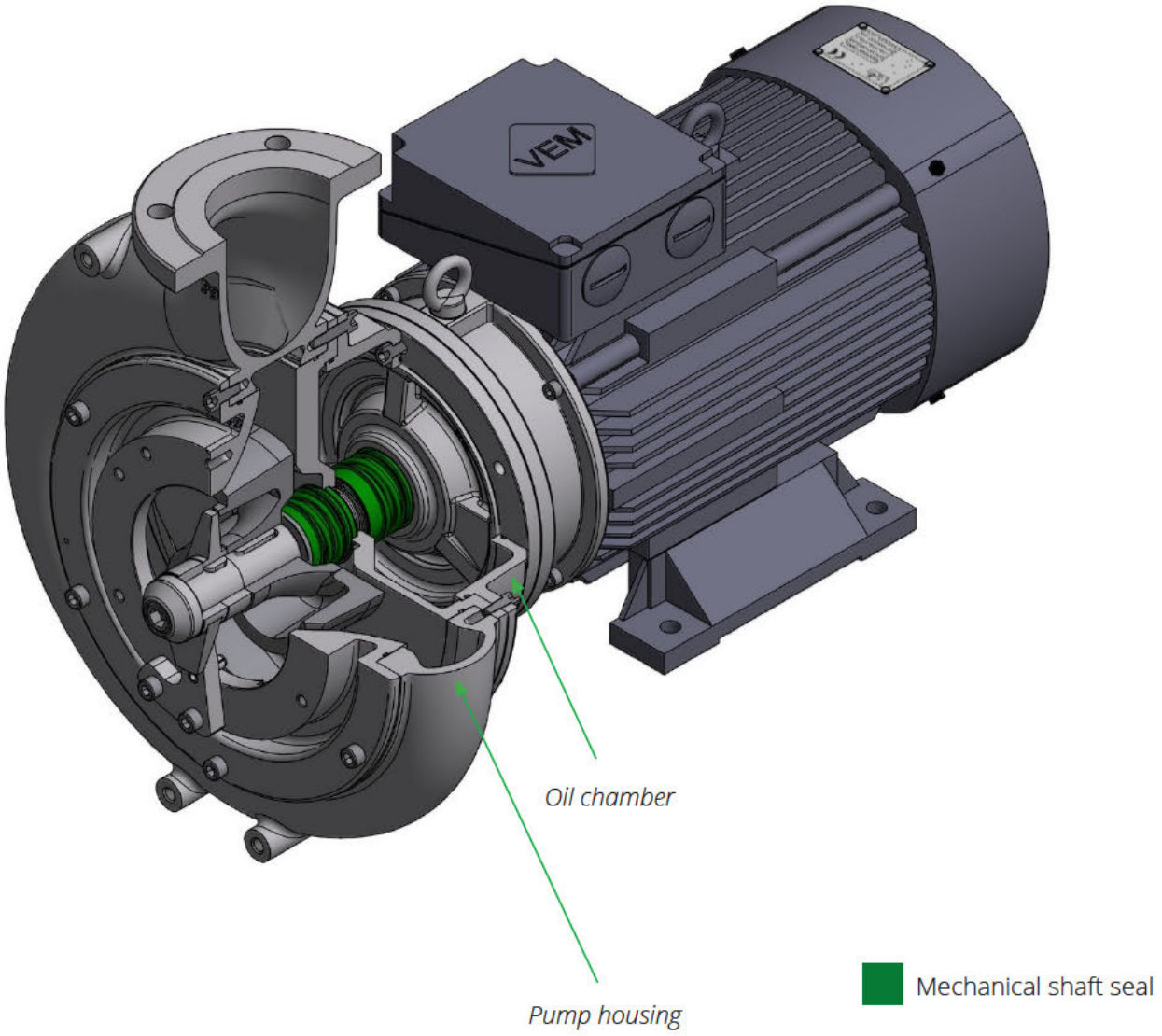
Regardless of any information provided in this technical detail sheet, the equipment to be provided will comply with the specified requirements.

Name (Print): _____ ***Signature:*** _____



DESIGN

The open pump impeller design means that the chopper pump can pump liquids with a high viscosity. For liquids containing abrasive particles, such as sand, Landia has developed special materials so that the pump's life span is extended significantly in comparison to a standard pump.
A large part of the MPTK-I programme can be supplied in acid-proof steel for aggressive liquids with a high or low pH.
MPTK-I pumps can be equipped with a knife system at the inlet to the pump, which ensures problem-free operation under conditions where many other pumps have problems with clogging.



ELECTRICAL DATA MPTK-I

Motor type	3-phase AC motor
Nominal voltage	400 V
Minimum voltage allowed	360 V
Nominal frequency	50 Hz
Applicable for VFD operation	Yes
Ingress protection rating	IP 55
Insulation class	F

Model	Item number	Nominal power	Motor	Full load current (400 V)	Connection method	Start current (DOL)	cos phi	Efficiency
		[kW]	[rpm]	[A]	Y/Δ	[A]		[%]
Medium Pressure								
MPTK-I 50 0.75 kW-1500 rpm IE3	2564197	0.75	1445	1.7	Y	11.9	0.77	82.5
MPTK-I 65 2.2 kW-1500 rpm IE3	2564702	2.2	1455	4.8	Y	44.6	0.77	86.7
MPTK-I 80 5.5 kW-1500 rpm IE3	2564805/06	5.5	1480	12.0	Δ	119	0.73	91.0
MPTK-I 105 11.0 kW-1500 rpm IE3	2564911//12	11.0	1475	21.0	Δ	158	0.83	91.4
MPTK-I 105 18.5 kW-1500 rpm IE3	2564918	18.5	1475	34.5	Δ	238	0.84	92.7
MPTK-I 150 30.0 kW-1500 rpm IE3	2564630	30.0	1485	54.5	Δ	381	0.85	93.6
MPTK-GI 105 18.5 kW-1500 rpm IE3	2564981	18.5	1475	34.5	Δ	238	0.84	92.7
MPTK-GI 150 30.0 kW-1500 rpm IE3	2564681	30.0	1485	54.5	Δ	381	0.85	93.6
High Pressure								
MPTK-I 50 5.5 kW-3000 rpm IE3	2562105	5.5	2925	11.1	Δ	92	0.80	89.2
MPTK-I 65 11.0 kW-3000 rpm IE3	2562711	11.0	2950	19.5	Δ	156	0.90	91.4
MPTK-I 65 18.5 kW-3000 rpm IE3	2562718	18.5	2960	32.0	Δ	294	0.90	92.4
MPTK-I 80 18.5 kW-3000 rpm IE3	2562818	18.5	2960	32.0	Δ	294	0.90	92.4
MPTK-I 80 22.0 kW-3000 rpm IE3	2562822	22.0	2975	37.5	Δ	334	0.91	92.7
MPTK-I 80 30.0 kW-3000 rpm IE3	2562830	30.0	2965	52.5	Δ	451	0.88	93.3

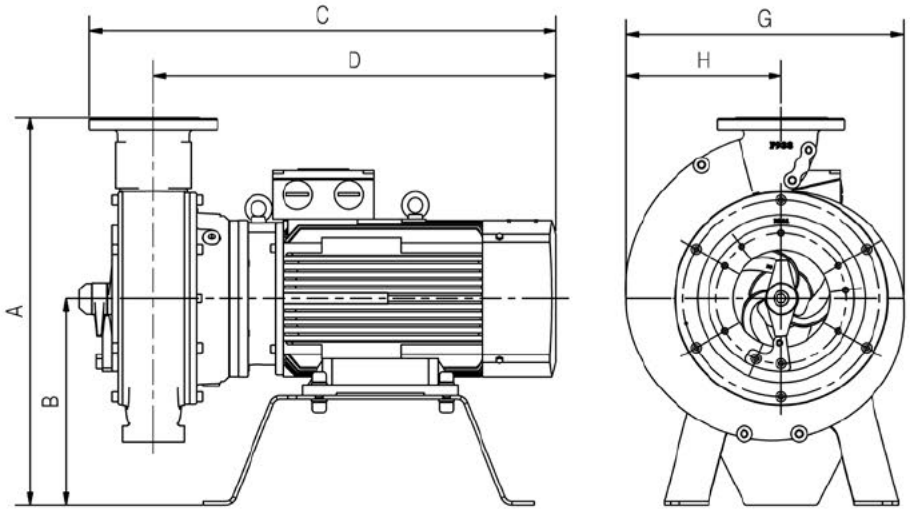
For voltages others than 400 V/50 Hz please refer to the attached Appendix.

ELECTRICAL DATA MPTK-I

Motor type	3-phase AC motor
Nominal voltage	400 V
Minimum voltage allowed	360 V
Nominal frequency	50 Hz
Applicable for VFD operation	Yes
Ingress protection rating	IP 55
Insulation class	F

Model	Item number	Nominal power	Motor	Full load current (400 V)	Connection method	Start current (DOL)	cos phi	Efficiency
		[kW]	[rpm]	[A]	Y/Δ	[A]		[%]
Medium Pressure								
MPTK-I 105 15,0 kW-1500 rpm Ex IE3	2564948	15,0	1490	28,0	Δ	294	0,83	92,8
MPTK-I 105 18,5 kW-1500 rpm Ex IE3	2564949	18,5	1475	34,5	Δ	238	0,84	92,7
MPTK-I 150 30,0 kW-1500 rpm Ex IE3	2564642	30,0	1485	54,5	Δ	381	0,85	93,6

OVERALL DIMENSIONS MPTK-I



Mode l	Item number.	A [mm]	B [mm]	C [mm]	D [mm]	G [mm]	H [mm]	Weight [kg]
Mellemtryk								
MPTK-I 50 0.75 kW-1500 rpm IE3	2564197	295	135	360	305	250	135	
MPTK-I 65 2.2 kW-1500 rpm IE3	2564702	455	250	629	536	320	175	
MPTK-I 80 5.5 kW-1500 rpm IE3	2564805/06	522	280	705	605	370	205	155
MPTK-I 105 11.0 kW-1500 rpm IE3	2564911/12	640	340	776	664	460	250	200
MPTK-I 105 18.5 kW-1500 rpm IE3	2564918	640	340	787	675	460	250	270
MPTK-I 150 30.0 kW-1500 rpm IE3	2564630	822	380	977	834	580	320	380
MPTK-GI 105 18.5 kW-1500 rpm IE3	2564981	640	340	787	675	460	250	270
MPTK-GI 150 30.0 kW-1500 rpm IE3	2564681	822	380	977	834	580	320	380
Højtryk								
MPTK-I 50 5.5 kW-3000 rpm IE3	2562105	410	250	545	490	250	135	
MPTK-I 65 11.0 kW-3000 rpm IE3	2562711	545	340	711	618	320	175	
MPTK-I 65 18.5 kW-3000 rpm IE3	2562718	545	340	708	615	320	175	
MPTK-I 80 18.5 kW-3000 rpm IE3	2562818	622	380	719	629	370	205	
MPTK-I 80 22.0 kW-3000 rpm IE3	2562822	622	380	768	678	370	205	
MPTK-I 80 30.0 kW-3000 rpm IE3	2562830	622	380	802	712	370	205	

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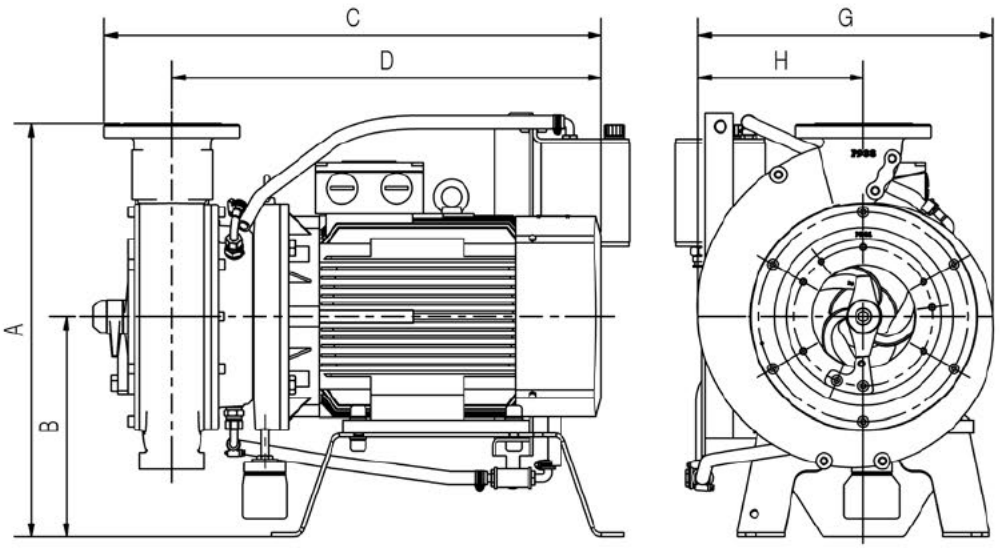
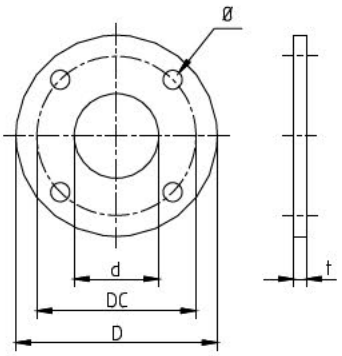
OVERALL DIMENSIONS MPTK-I EX



Model	Item number	A [mm]	B [mm]	C [mm]	D [mm]	G [mm]	H [mm]	Weight [kg]
Medium pressure								
MPTK-I 105 15.0 kW-1,500 rpm Ex IE3	2564948	640	340	820	715	460	250	228
MPTK-I 105 18.5 kW-1,500 rpm Ex IE3	2564949	640	340	820	715	460	250	228
MPTK-I 150 30.0 kW-1,500 rpm Ex IE3	2564642	822	380	1010	870	580	320	510

OVERALL DIMENSIONS WELDING FLANGE



Model/ Pump series	Article no.	Material	MPTK 50 - 65 – 80 - 105 DIN 2573 PN 6 Dim. [mm] MPTK 150 2576 PN 10 Dim. [mm]				
			D	DC	d	ø	t
MPTK-I 50	7713006	W1.0038/S235JR	ø110	90	ø52	4 x ø10	8
MPTK-I 65	7713052	W1.0038/S235JR	ø160	130	ø69	4 x ø14	8
MPTK-I 80	7713053	W1.0038/S235JR	ø192	150/160	ø82	4 x ø18	10
MPTK-I 105	7713054	W1.0038/S235JR	ø212	170/180	ø107	4 x ø18	10
MPTK-I 150	7713009	W1.0038/S235JR	ø285	240	ø152	8 x ø22	12

[redacted]

Performance curve

MPTK-I | Size 80 | 50 Hz

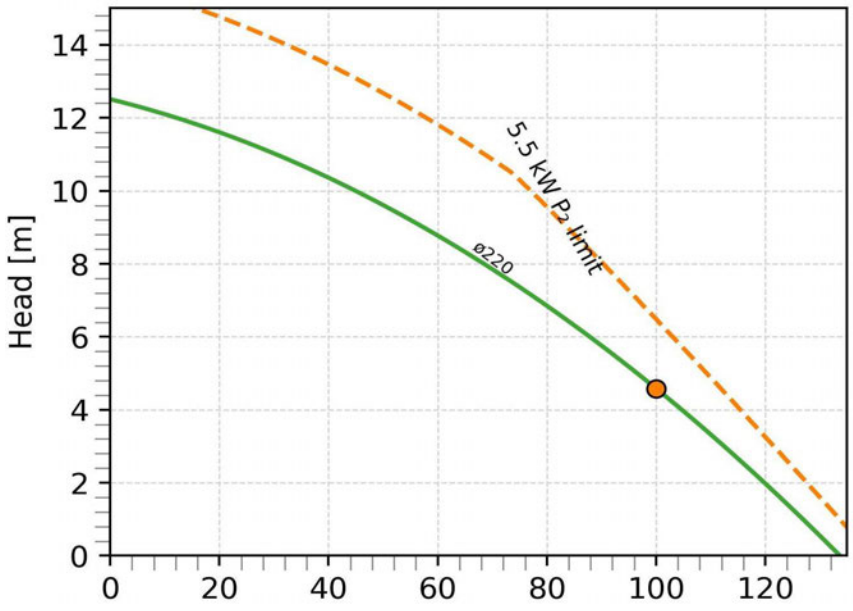
Nominal motor shaft power	5.5 kW @ 50 Hz
Efficiency class	IE1
Motor nominal speed	1500 rpm
Power supply	50 Hz 400 V
Impeller type	P3
Impeller Diameter	ø220 mm
Inlet Diameter	ø130 mm
Knife system	Single knife system
Reference curve tolerance	ISO9906 Grade 3B

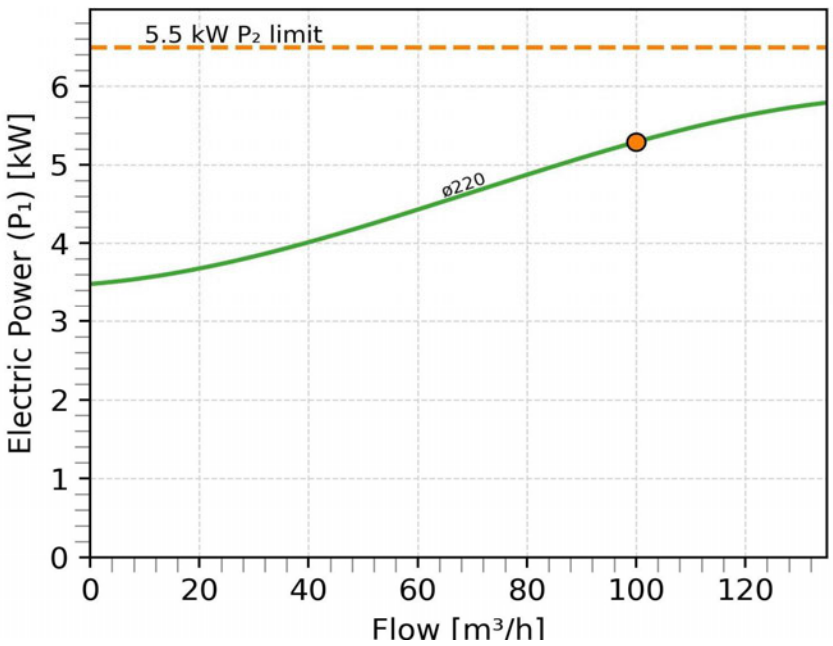
MEDIUM

Description	Disgester sludge
TS%	4%
Density	1000 kg/m³
Pumpabilty index	2

DESIGN POINT

Flow	100 m³/h
Head	4.58 m
Power	5.29 kW





CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

SUPPLY CHAIN MANAGEMENT

Tenders & Contracts, Supply Chain Management

SCM Water and Sanitation

Email: SCM.Tenders9@capetown.gov.za

14 OCTOBER 2024

[redacted]

Dear Sir

TENDER NO.: 191Q/2023/24
DESCRIPTION: Design Build of Mechanical and Electrical Works for the Upgrading and Expansion of the Macassar Wastewater Treatment Works.

TENDER CLARIFICATION NO.2

The City of Cape Town (CCT) is currently evaluating the above tender, and in terms of clauses C.2.17 and C.3.10 of the Contract Document, please clarify the following items in order for the CCT to proceed with the evaluation of this Tender.

VOLUME 2: Returnable Documents
Part C2.2: Schedule of Quantities
Zero Tendered Rates

The tenderer has indicated zero tendered rates for the line items listed in **Table 1**. The BEC requires the tenderer to confirm that the listed items are either nil rate items, or items for which the cost has been included in other prices or rates in the Schedule of Quantities. If the cost has been included elsewhere, the BEC requires the tenderer to confirm the item number/s in which the cost has been included. Please tick the applicable box provided.

Table 1: *Schedule of Quantities - Zero Tendered Rates*

Schedule No.	Schedule Description	Item Number	Line-Item Description
P&Gs	General Requirements and Conditions	P&Gs-25	Provision of facilities for the Engineer, as described in the Scope of Work
☐ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in schedule _____ item _____.			
M5	Odour Control and Covers	M5-12	Media / chemicals as required
☐ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in schedule _____ item _____.			
M5	Odour Control and Covers	M5-20	Media / chemicals as required
☐ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in schedule _____ item _____.			

M5	Odour Control and Covers	M5-28	Media / chemicals as required
☐ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in schedule _____ item _____.			
M21	Gravity Thickeners	M21-2	V-notch weirs
☐ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in schedule _____ item _____.			
M29	Polyelectrolyte Preparation Equipment	M29-9	Poly injector
☐ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in schedule _____ item _____.			
M32	Ventilation Systems	M32-12	MV intake substation split AC units
☐ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in schedule _____ item _____.			
M32	Ventilation Systems	M32-31	MV intake substation split AC units
☐ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in schedule _____ item _____.			
M33	Spares	M33-151	Supplier recommended spares for Gas Holding Tanks
☐ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in schedule _____ item _____.			
M33	Spares	M33-162	All other spares as per OEM's recommended list
☐ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in schedule _____ item _____.			
M36	Maintenance Inspection (Part Time)	M36-12	Primary sludge screening facility
☐ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in schedule _____ item _____.			
E4	Distribution Transformers	E4-16	Foundation earthing and earth cabling for centralised earthing system
☐ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in schedule _____ item _____.			
E10	Area Lightning	E10-47	16mm² x 4 core
☐ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in schedule _____ item _____.			
E10	Area Lightning	E10-48	25mm² x 4 core
☐ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in schedule _____ item _____.			
E12	Diesel Generators	E12-5	Overhead busbar trunking
☐ Yes, this is a nil rated item.			

☐ No, this is not a nil rated item. The cost for this item has been included in schedule _____ item _____.			
E13	Instrumentation and Fieldbus Cables	E13-356	1,5 mm² 12-pair o/all scr
☐ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in schedule _____ item _____.			
E14	Measuring Instrumentation	E14-6	Temperature instruments transducer
☐ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in schedule _____ item _____.			
E14	Measuring Instrumentation	E14-48	Solenoid Valve
☐ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in schedule _____ item _____.			
E14	Measuring Instrumentation	E14-49	Pneumatic Valve
☐ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in schedule _____ item _____.			
E14	Measuring Instrumentation	E14-77	Solenoid Valve
☐ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in schedule _____ item _____.			
E14	Measuring Instrumentation	E14-78	Pneumatic Valve
☐ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in schedule _____ item _____.			
E14	Measuring Instrumentation	E14-85	Solenoid Valve
☐ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in schedule _____ item _____.			
E14	Measuring Instrumentation	E14-86	Pneumatic Valve
☐ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in schedule _____ item _____.			
E14	Measuring Instrumentation	E14-92	Temperature instruments transducer
☐ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in schedule _____ item _____.			

VOLUME 2: Returnable Documents
Part C2.2: Schedule of Quantities
Rate Included elsewhere

The tenderer has indicated that the rates or lump sums for the line items listed in **Error! Reference source not found.** are included elsewhere. The BEC requires the tenderer to indicate in which other line items these costs have been included.

Table 2: *Schedule of Quantities - Rates Included Elsewhere*

Schedule No.	Schedule Description	Item No.	Line-Item Description	Line item/s in which the cost of the listed item is included
M1	Archimedean Screw Pumps	M1-2	Bottom Bearing Lubrication System	

Schedule No.	Schedule Description	Item No.	Line-Item Description	Line item/s in which the cost of the listed item is included
M6	Primary Settling Tanks	M6-2	Spray bar system (including pumps, pipework, valves and supports)	
M6	Primary Settling Tanks	M6-3	V-notch weir	
M6	Primary Settling Tanks	M6-4	Central inlet pipe and stilling well	
M8	Fine Bubble Diffused Aeration	M8-2	Stainless steel manifolds and connecting pipework to each blower inside blower room complete with isolation valves, non-return valves and supports for centrifugal type blower package	
M8	Fine Bubble Diffused Aeration	M8-4	Stainless steel elevated blowline at reactor walkway including couplings, elbows and supports	
M8	Fine Bubble Diffused Aeration	M8-5	Drop legs from blowline to reactor floor including supports and lateral s/s piping	
M8	Fine Bubble Diffused Aeration	M8-12	Stainless steel blowline from blower room to reactor walkway including connections to manifold at blower room. Couplings and supports to be included	
M8	Fine Bubble Diffused Aeration	M8-13	Stainless steel elevated blowline at reactor walkway including couplings, elbows and supports	
M8	Fine Bubble Diffused Aeration	M8-14	Drop legs from blowline to reactor floor including supports and lateral s/s piping	
M8	Fine Bubble Diffused Aeration	M8-15	Allow for all costs and expenses in connection with the Site installation of the following: All materials and equipment summarized in Bill M8 for Items 6 & 7 (V-Port knife gate valve including electric actuator for V-Port knife gate valve modulation and Manual isolation knife gate valve (upstream of each V-Port knife gate valve))	
M11	Secondary Settling Tanks	M11-2	V-notch weirs	
M11	Secondary Settling Tanks	M11-3	Scum removal system (includes scum box, scum scraper, baffle plate, etc)	
M11	Secondary Settling Tanks	M11-4	Central inlet pipe and stilling well	
M15	Compressed Air Systems (Instrument air)	M15-7	Pneumatic actuated valves (inside chlorine building)	
M24	Sludge Heating Equipment	M24-4	Dual Fuel Burner (complete with integrated gas train, forced daft fan, fuel circulation pump, etc.).	
M25	Anaerobic Digester Sludge Equipment	M25-3	Discharge mixing nozzles, scum and foam suppression equipment inside the digesters.	
M33	Spares	M33-2	Complete spare top bearing and all seals provided for Lower Archimedean screw pumps	
M33	Spares	M33-3	Bearing grease refills enough for 6 months for Lower Archimedean screw pumps	
M33	Spares	M33-6	Complete spare top bearing and all seals provided for Upper Archimedean screw pumps	
M33	Spares	M33-7	Bearing grease refills enough for 6 months for Upper Archimedean screw pumps	
M33	Spares	M33-31	Spare actuator to regulate diffuser vanes for each Blower supplied.	
M33	Spares	M33-32	Blower Oil Refill for the blowers supplied	
M33	Spares	M33-33	All special tools for blower maintenance	
M33	Spares	M33-35	Blower inlet filters - two per unit supplied fully sealed in original packaging.	
M33	Spares	M33-36	Acoustic enclosure cooling fan including motor	

Schedule No.	Schedule Description	Item No.	Line-Item Description	Line item/s in which the cost of the listed item is included
M33	Spares	M33-158	complete engine fanbelt	
M33	Spares	M33-159	complete air filter set	
M33	Spares	M33-161	complete oil filter set	
M34	Sundries	M34-14	Operational and Maintenance Training	
M35	Process Control Assistance, Maintenance and Training (Full Time)	M35-25	Gas holding tanks	
M36	Maintenance Inspection (Part Time)	M36-15	Gas holding tanks	
M36	Maintenance Inspection (Part Time)	M36-38	Anaerobic digesters	
M36	Maintenance Inspection (Part Time)	M36-39	Gas holding tanks	
M36	Maintenance Inspection (Part Time)	M36-62	Anaerobic digesters	
M36	Maintenance Inspection (Part Time)	M36-63	Gas holding tanks	
E20	Miscellaneous and Sundries	E20-6	Substation Automation	
E20	Miscellaneous and Sundries	E20-11	LV Switchgear, control assemblies and VFCs	
E20	Miscellaneous and Sundries	E20-13	Instrumentation	
E20	Miscellaneous and Sundries	E20-14	PLCs and Control hardware and panels	
E20	Miscellaneous and Sundries	E20-15	PLCs and Control system: software and functionality	
E20	Miscellaneous and Sundries	E20-16	Instrumentation Junction Box, Valve Bank, Local Control Panel and Communication Panel Control Hardware and Steelwork	
E20	Miscellaneous and Sundries	E20-17	SCADA, Historian and Reporting	

VOLUME 2: Returnable Documents
Part C2.2: Schedule of Quantities
Additional items included

The Schedule of Quantities made provision for "Other general expenses incurred in complying with the requirements of the Scope of Work not included above" to be added to each schedule. The tenderer has included additional rates for the schedule given in **Error! Reference source not found.**. However, the tenderer has not provided a description of the additional expenses included. The BEC thus requires a description of the additional expense included for the schedule given in **Error! Reference source not found.**.

Table 3: *Schedule of Quantities - Items with no associated description*

Schedule No.	Schedule Description	Line-Item Number	Line-Item Description
M5	Odour Control and Covers	M5-34	None provided.

VOLUME 2: Returnable Documents
Part C2.2: Schedule of Quantities
Unbalanced Rates (Excessively high)

In terms of Clause C.3.9.4 ("Arithmetic errors, omissions and discrepancies"), in the event of tendered rates or lump sums being declared by the Employer to be unacceptable to it because they are not priced, either excessively low or high, or not in proper balance with other rates or lump sums, the Tenderer may be required to produce evidence and advance arguments in support of the tendered rates or lump sums objected to.

The BEC thus requires the tenderer to provide a justification of the rates and lump sum amounts for the items listed in **Table 4**

Table 4: *Schedule of Quantities – Excessively high tendered rates and lump sums*

Schedule No.	Schedule Description	Line-Item Number	Line-Item Description
P&Gs	General Requirements and Conditions	P&Gs-1	Providing Performance Security
P&Gs	General Requirements and Conditions	P&Gs-2	Providing Insurances
M34	Sundries	M34-12	Cost of fuel (Diesel) for up to 6 hours per day (including delivery) for the duration of pre-commissioning, commissioning and Trial Operation Period
E9	Cable Supports	E9-1	Stainless steel 316 cable ladder, 2mm thick side rails, channel cross rungs at 300mm centres, complete with couplers, clamps, threaded rods, hangers, cantilevers, brackets etc. to fix to trusses, walls for large installations: All equipment associated with Inlet Works MCC 92EI03-PNL01
E9	Cable Supports	E9-2	Stainless steel 316 cable ladder, 2mm thick side rails, channel cross rungs at 300mm centres, complete with couplers, clamps, threaded rods, hangers, cantilevers, brackets etc. to fix to trusses, walls for large installations: All equipment associated with Bioreactor MCC 92EI04-PNL01
E9	Cable Supports	E9-4	Stainless steel 316 cable ladder, 2mm thick side rails, channel cross rungs at 300mm centres, complete with couplers, clamps, threaded rods, hangers, cantilevers, brackets etc. to fix to trusses, walls for large installations: All equipment associated with Dewatering MCC 92EI01-PNL01
E9	Cable Supports	E9-5	Stainless steel 316 cable ladder, 2mm thick side rails, channel cross rungs at 300mm centres, complete with couplers, clamps, threaded rods, hangers, cantilevers, brackets etc. to fix to trusses, walls for large installations: All equipment associated with Service Water MCC 92EI06-PNL01
E9	Cable Supports	E9-6	Stainless steel 316 cable ladder, 2mm thick side rails, channel cross rungs at 300mm centres, complete with couplers, clamps, threaded rods, hangers, cantilevers, brackets etc. to fix to trusses, walls for large installations: All equipment associated with ultraviolet MCC 92EI02-PNL01
E9	Cable Supports	E9-8	Stainless steel 316 welded wire mesh cable tray, 50 x 50mm base aperture, 25 x 50mm side aperture, complete with splices, couplers, clamps, threaded rods, hangers, brackets etc to fix to trusses, walls etc for small installations: All equipment associated with Bioreactor MCC 92EI04-PNL01
E9	Cable Supports	E9-10	Stainless steel 316 welded wire mesh cable tray, 50 x 50mm base aperture, 25 x 50mm side aperture, complete with splices, couplers, clamps, threaded rods, hangers, brackets etc to fix to trusses, walls etc for small installations:

Schedule No.	Schedule Description	Line-Item Number	Line-Item Description
			All equipment associated with Dewatering MCC 92EI01-PNL01
E9	Cable Supports	E9-11	Stainless steel 316 welded wire mesh cable tray, 50 x 50mm base aperture, 25 x 50mm side aperture, complete with splices, couplers, clamps, threaded rods, hangers, brackets etc to fix to trusses, walls etc for small installations: All equipment associated with Service Water MCC 92EI06-PNL01
E9	Cable Supports	E9-12	Stainless steel 316 welded wire mesh cable tray, 50 x 50mm base aperture, 25 x 50mm side aperture, complete with splices, couplers, clamps, threaded rods, hangers, brackets etc to fix to trusses, walls etc for small installations: All equipment associated with Ultraviolet MCC 92EI02-PNL01
E9	Cable Supports	E9-14	Allow for all costs and expenses in connection with the installation of stainless steel 316 cable ladder, 3mm thick side rails, channel cross rungs at 300mm centres, complete with couplers, clamps, threaded rods, hangers, cantilevers, brackets etc. to fix to trusses, walls for large installations: All equipment associated with Bioreactor MCC 92EI04-PNL01
E9	Cable Supports	E9-16	Allow for all costs and expenses in connection with the installation with regards to Stainless steel 316 cable ladder, 3mm thick side rails, channel cross rungs at 300mm centres, complete with couplers, clamps, threaded rods, hangers, cantilevers, brackets etc. to fix to trusses, walls for large installations: All equipment associated with Dewatering MCC 92EI01-PNL01
E9	Cable Supports	E9-22	Allow for all costs and expenses in connection with the installation with regards to Stainless steel 316 welded wire mesh cable tray, 50 x 50mm base aperture, 25 x 50mm side aperture, complete with splices, couplers, clamps, threaded rods, hangers, brackets etc to fix to trusses, walls etc for small installations: All equipment associated with Dewatering MCC 92EI01-PNL01
E19	Programmable Logic Controller (PLC)	E19-1	PLC Software Licensing
E19	Programmable Logic Controller (PLC)	E19-2	Network Management Software Licensing
E19	Programmable Logic Controller (PLC)	E19-3	Condition Software Licensing
E19	Programmable Logic Controller (PLC)	E19-4	Inlet Works: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Double Door Hot-Standby - With HMI
E19	Programmable Logic Controller (PLC)	E19-5	Inlet Works: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Double Door Hot-Standby - Without HMI
E19	Programmable Logic Controller (PLC)	E19-6	Bioreactor: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Double Door Standard PLC - With HMI

Schedule No.	Schedule Description	Line-Item Number	Line-Item Description
E19	Programmable Logic Controller (PLC)	E19-8	Primary Settling PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI
E19	Programmable Logic Controller (PLC)	E19-9	Secondary Settling: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI
E19	Programmable Logic Controller (PLC)	E19-10	Blower: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI
E19	Programmable Logic Controller (PLC)	E19-11	Dewatering: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Double Door Standard PLC - With HMI
E19	Programmable Logic Controller (PLC)	E19-12	Dewatering: PLC Panel (E Excluding xcl Steel Work) - Main PLC Panel Type Double Door No PLC - Without HMI
E19	Programmable Logic Controller (PLC)	E19-13	Primary Sludge: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - Without HMI
E19	Programmable Logic Controller (PLC)	E19-14	Waste Activated Sludge: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - Without HMI
E19	Programmable Logic Controller (PLC)	E19-15	Service Water: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI
E19	Programmable Logic Controller (PLC)	E19-16	Service Water: Conditional Monitoring Equipment
E19	Programmable Logic Controller (PLC)	E19-17	TSE Pump Station: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI
E19	Programmable Logic Controller (PLC)	E19-18	TSE Pump Station: Conditional Monitoring Equipment
E19	Programmable Logic Controller (PLC)	E19-19	Allow for all costs and expenses in connection with the installation of the Inlet Works: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Double Door Hot-Standby - With HMI
E19	Programmable Logic Controller (PLC)	E19-20	Allow for all costs and expenses in connection with the installation of the Inlet Works: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Double Door Hot-Standby - Without HMI
E19	Programmable Logic Controller (PLC)	E19-21	Allow for all costs and expenses in connection with the installation of the Inlet Works: PLC Software Development
E19	Programmable Logic Controller (PLC)	E19-22	Allow for all costs and expenses in connection with the installation of the Bioreactor: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Double Door Standard PLC - With HMI
E19	Programmable Logic Controller (PLC)	E19-23	Allow for all costs and expenses in connection with the installation of the Bioreactor:

Schedule No.	Schedule Description	Line-Item Number	Line-Item Description
			PLC Panel (Excluding Steel Work) - Main PLC Panel Type Double Door No PLC - Without HMI
E19	Programmable Logic Controller (PLC)	E19-24	Allow for all costs and expenses in connection with the installation of the Bioreactor: PLC Software Development
E19	Programmable Logic Controller (PLC)	E19-25	Allow for all costs and expenses in connection with the installation of the Primary Settling PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI
E19	Programmable Logic Controller (PLC)	E19-26	Allow for all costs and expenses in connection with the installation of the Primary Settling PLC Software Development
E19	Programmable Logic Controller (PLC)	E19-27	Allow for all costs and expenses in connection with the installation of the Secondary Settling: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI
E19	Programmable Logic Controller (PLC)	E19-28	Allow for all costs and expenses in connection with the installation of the Secondary Settling: PLC Software Development
E19	Programmable Logic Controller (PLC)	E19-29	Allow for all costs and expenses in connection with the installation of the Blower: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI
E19	Programmable Logic Controller (PLC)	E19-30	Allow for all costs and expenses in connection with the installation of the Blower: Conditional Monitoring Equipment
E19	Programmable Logic Controller (PLC)	E19-31	Allow for all costs and expenses in connection with the installation of the Dewatering: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Double Door No PLC - Without HMI
E19	Programmable Logic Controller (PLC)	E19-32	Allow for all costs and expenses in connection with the installation of the Dewatering: PLC Software Development
E19	Programmable Logic Controller (PLC)	E19-33	Allow for all costs and expenses in connection with the installation of the Primary Sludge: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - Without HMI
E19	Programmable Logic Controller (PLC)	E19-34	Allow for all costs and expenses in connection with the installation of the Primary Sludge: PLC Software Development
E19	Programmable Logic Controller (PLC)	E19-35	Allow for all costs and expenses in connection with the installation of the Waste Activated Sludge: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - Without HMI
E19	Programmable Logic Controller (PLC)	E19-36	Allow for all costs and expenses in connection with the installation of the Waste Activated Sludge: PLC Software Development
E19	Programmable Logic Controller (PLC)	E19-37	Allow for all costs and expenses in connection with the installation of the Ultraviolet Filtration:

Schedule No.	Schedule Description	Line-Item Number	Line-Item Description
			PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI
E19	Programmable Logic Controller (PLC)	E19-38	Allow for all costs and expenses in connection with the installation of the Ultraviolet Filtration: PLC Software Development
E19	Programmable Logic Controller (PLC)	E19-39	Allow for all costs and expenses in connection with the installation of the Service Water: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI
E19	Programmable Logic Controller (PLC)	E19-40	Allow for all costs and expenses in connection with the installation of the Service Water: Conditional Monitoring Equipment
E19	Programmable Logic Controller (PLC)	E19-41	Allow for all costs and expenses in connection with the installation of the Service Water: PLC Software Development
E19	Programmable Logic Controller (PLC)	E19-42	Allow for all costs and expenses in connection with the installation of the TSE Pump Station: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI
E19	Programmable Logic Controller (PLC)	E19-43	Allow for all costs and expenses in connection with the installation of the TSE Pump Station: Conditional Monitoring Equipment
E19	Programmable Logic Controller (PLC)	E19-44	Allow for all costs and expenses in connection with the installation of the TSE Pump Station: PLC Software Development

VOLUME 2: Returnable Documents
Part C2.2: Schedule of Quantities
Arithmetic Errors

In terms of Clause C.3.9 ("Arithmetic errors, omissions and discrepancies"), the Employer undertakes to notify the tenderer of all errors or omissions that are identified in the tender offer and either confirm the tender offer as tendered or accept the corrected total of prices. The errors identified by the BEC are presented in **Table 5**.

Table 5: *Schedule of Quantities – Arithmetic Errors*

	Schedule No. and Description	Item No.	Description of error	Tendered Amount	Correct Amount
a	M26: Sludge Holding Tanks Equipment	N/A	Arithmetic error. The sum of the amounts stated for the items in this schedule is less than what the tenderer has offered.	R40 701 011.00	R38 335 392.00
b	E13: Instrumentation and Fieldbus Cables	E13-242	Tenderer changed item to "Rate Only". However, at tender the item was not stated as "Rate Only".	R31 374 004.00	R31 402 399.38

Considering the errors indicated in **Table 5**, the corrected value of the final tender sum, inclusive of 15% VAT, is now R 2 540 254 549.29. The BEC requires the tenderer to confirm whether they choose this correct amount (i.e., R 2 540 254 549.29) or the original tendered amount of R 2 543 143 941.99. Please tick the applicable box below:

☐ Yes, we choose the corrected amount.

☐ No, we choose the original tendered amount, and have provided rebalanced schedules for those listed in **Table 5**.

Please submit your response as requested to SCM.Tenders9@capetown.gov.za by no later than Tuesday, 15 October 2024 at 10:00.

[redacted]

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Director: Supply Chain Management

City of Cape Town
Supply Chain Management
SCM.Tenders9@capetown.gov.za

18 October 2024

TENDER NO.: 191Q/2023/24
DESCRIPTION: DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS.

TENDER CLARIFICATION NO.2

Dear Sir,

With reference to your letter dated 14 October 2024, please find herewith our response as follows:

Table 1: *Schedule of Quantities* - Zero *Tendered Rates*

Schedule No.	**Schedule Description**	**Item Number**	**Line-Item Description**
P&Gs	General Requirements and Conditions	P&Gs-25	Provision of facilities for the Engineer, as described in the Scope of Work
☐ Yes, this is a nil rated item. ✓ No, this is not a nil rated item. The cost for this item has been included in **schedule P&G item 7**			
M5	Odour Control and Covers	M5-12	Media / chemicals as required
✓ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in **schedule_____item**			
M5	Odour Control and Covers	M5-20	Media / chemicals as required
✓ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in **schedule_____item**			
M5	Odour Control and Covers	M5-28	Media / chemicals as required
✓ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in **schedule__item**			
M21	Gravity Thickeners	M21-2	V-notch weirs
☐ Yes, this is a nil rated item. ✓ No, this is not a nil rated item. The cost for this item has been included in **schedule M21 item 1**			
M29	Polyelectrolyte Preparation Equipment	M29-9	Poly injector
☐ Yes, this is a nil rated item. ✓ No, this is not a nil rated item. The cost for this item has been included in **schedule M27 item 27-3 & 27-6**			
The cost for this item has been included in schedule M27 item 27-3 & 27-6 as included in schedule of quantities as submitted at time of tender			

[redacted]

M32	Ventilation Systems	M32-12	MV intake substation split AC units
☐ Yes, this is a nil rated item. ✓ No, this is not a nil rated item. The cost for this item has been included in **schedule M32 item 8**			
The cost for this item has been included in schedule M32 item M32-8			
M32	Ventilation Systems	M32-31	MV intake substation split AC units
☐ Yes, this is a nil rated item. ✓ No, this is not a nil rated item. The cost for this item has been included in **schedule M32 item 28**			
The cost for this item has been included in schedule M32 item M32-28			
M33	Spares	M33-151	Supplier recommended spares for Gas Holding Tanks
☐ Yes, this is a nil rated item. ✓ No, this is not a nil rated item. The cost for this item has been included in schedule **M23 item 12**			
We didn't price for spares since the gas holding tanks were given a provisional sum of R8M in item M23-12 as seen below and we assumed the spares will be treated as part of the provisional sum allowance.			
M23-12	Provisional sum for double membrane gas storage tanks (2 off) with combined storage capacity of 9020 m^3 (complete with flame arresters, pressure safety equipment, valves and any pipework, pipe supports, etc. as shown on relevant drawings). To include installation and commissioning	Prov sum	1	8 000 000	R 8 000 000.00
M33	Spares	M33-162	All other spares as per OEM's recommended list
☐ Yes, this is a nil rated item. ✓ No, this is not a nil rated item. The cost for this item has been included in schedule **M33 item 152**			
M36	Maintenance Inspection (Part Time)	M36-12	Primary sludge screening facility
☐ Yes, this is a nil rated item. ✓ No, this is not a nil rated item. The cost for this item has been included in **schedule M36 item 20**			
The cost for this item has been included in schedule M36 item M36-20			
E4	Distribution Transformers	E4-16	Foundation earthing and earth cabling for centralised earthing system
☐ Yes, this is a nil rated item. ✓ No, this is not a nil rated item. The cost for this item has been included in **schedule E11 item 42**			
E10	Area Lightning	E10-47	16mm* x 4 core
☐ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in **schedule___item**			
Rate value was omitted the rate should be identified as R 15.75			
E10	Area Lightning	E10-48	25mm* x 4 core
☐ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in **schedule___item**			
Rate value was omitted the rate should be identified as R19.69			
E12	Diesel Generators	E12-5	Overhead busbar trucking
✓ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in **schedule___item**			
Item E12-5 has been duplicated under Item E4-11, though the quantities differ. The description for Item E4-11 is more appropriate for the schedule, and the quantity listed is a more accurate reflection of the actual site requirements.			

[redacted]

E13	Instrumentation and Fieldbus Cables	E13-356	1,5 mm* 12-pair o/all scr
☐ Yes, this is a nil rated item. ☐ No, this is not a nil rated item. The cost for this item has been included in **schedule__item __**			
Rate value was omitted the rate should be identified as R15.75			
E14	Measuring Instrumentation	E14-6	Temperature instruments transducer
☐ Yes, this is a nil rated item. ✓ No, this is not a nil rated item. The cost for this item has been included in **schedule__item __**			
Quantity of 0 shown as per item E14-6 on the schedule of Quantities therefore the item was deemed not applicable, if the intention was a rate only the rate would be R 5 946-00+VAT			
E14	Measuring Instrumentation	E14-48	Solenoid Valve
☐ Yes, this is a nil rated item. ✓ No, this is not a nil rated item. The cost for this item has been included in **schedule M27 item 2, 7 & 20**			
The cost for this item has been included in schedule M27 item M27-2, M27-7 and M27-20			
E14	Measuring Instrumentation	E14-49	Pneumatic Valve
☐ Yes, this is a nil rated item. ✓ No, this is not a nil rated item. The cost for this item has been included in **schedule M28 item 3 & 4**			
The cost for this item has been included in schedule M28 item M28-3 & M28-4			
E14	Measuring Instrumentation	E14-77	Solenoid Valve
☐ Yes, this is a nil rated item. ✓ No, this is not a nil rated item. The cost for this item has been included in **schedule M18 item 3**			
The cost for this item has been included in schedule M18 item M18-3			
E14	Measuring Instrumentation	E14-78	Pneumatic Valve
☐ Yes, this is a nil rated item. ✓ No, this is not a nil rated item. The cost for this item has been included in **schedule M18 item 3**			
The cost for this item has been included in schedule M18 item M18-3			
E14	Measuring Instrumentation	E14-85	Solenoid Valve
☐ Yes, this is a nil rated item. ✓ No, this is not a nil rated item. The cost for this item has been included in **schedule M17 item 7 & 8**			
The cost for this item has been included in schedule M17 item M17-7 & M17-8			
E14	Measuring Instrumentation	E14-86	Pneumatic Valve
☐ Yes, this is a nil rated item. ✓ No, this is not a nil rated item. The cost for this item has been included in **schedule M17 item 7 & 8**			
The cost for this item has been included in schedule M17 item M17-7 & M17-8			
E14	Measuring Instrumentation	E14-92	Temperature instruments transducer
☐ Yes, this is a nil rated item. ✓ No, this is not a nil rated item. The cost for this item has been included in **schedule__item __**			
Quantity of 0 shown as per item E14-92 on the schedule of Quantities therefore the item was deemed not applicable, if the intention was a rate only the rate would be R 5 946			

[redacted]

Table 2: *Schedule of Quantities - Rates Included Elsewhere*

Schedule No.	Schedule Description	Item No.	Line-Item Description	Line item/s in which the cost of the listed item is included
M1	Archimedean Screw Pumps	M1-2	Bottom Bearing Lubrication System	Incl in M1.1
M6	Primary Settling Tanks	M6-2	Spray bar system (including pumps, pipework, valves and supports)	Incl in M6.1
M6	Primary Settling Tanks	M6-3	V-notch weir	
M6	Primary Settling Tanks	M6-4	Central inlet pipe and stilling well	
M8	Fine Bubble Diffused Aeration	M8-2	Stainless steel manifolds and connecting pipework to each blower inside blower room complete with isolation valves, non-return valves and supports for centrifugal type blower package	Incl in M8.1
M8	Fine Bubble Diffused Aeration	M8-4	Stainless steel elevated blowline at reactor walkway including couplings, elbows and supports	Incl in M8.3
M8	Fine Bubble Diffused Aeration	M8-5	Drop legs from blowline to reactor floor including supports and lateral sis piping	
M8	Fine Bubble Diffused Aeration	M8-12	Stainless steel blowline from blower room to reactor walkway including connections to manifold at blower room. Couplings and supports to be included	Incl in M8.11
M8	Fine Bubble Diffused Aeration	M8-13	Stainless steel elevated blowline at reactor walkway including couplings, elbows and supports	
M8	Fine Bubble Diffused Aeration	M8-14	Drop legs from blowline to reactor floor including supports and lateral sis piping	
M8	Fine Bubble Diffused Aeration	M8-15	Allow for all costs and expenses in connection with the Site installation of the following: All materials and equipment summarized in Bill M8 for Items 6 & 7 (V-Port knife gate valve including electric actuator for V-Port knife gate valve modulation and Manual isolation knife gate valve (upstream of each V-Port knife gate valve)	
M11	Secondary Settling Tanks	M11-2	V-notch weirs	Incl in M11.1
M11	Secondary Settling Tanks	M11-3	Scum removal system (includes scum box, scum scraper, baffle plate, etc.)	
M11	Secondary Settling Tanks	M11-4	Central inlet pipe and stilling well	
M15	Compressed Air Systems (Instrument air)	M15-7	Pneumatic actuated valves (inside chlorine building)	Incl in M13.4
M24	Sludge Heating Equipment	M24-4	Dual Fuel Burner (complete with integrated gas train, forced daft fan, fuel circulation pump, etc.)	Incl in M24.3
M25	Anaerobic Digester Sludge Equipment	M25-3	Discharge mixing nozzles, scum and foam suppression equipment inside the digesters.	Incl in M25.1
M33	Spares	M33-2	Complete spare top bearing and all seals provided for Lower Archimedean screw pumps	Incl in M33.1

[redacted]

M33	Spares	M33-3	Bearing grease refills enough for 6 months for Lower Archimedean screw pumps	Incl in M33.1
M33	Spares	M33-6	Complete spare top bearing and all seals provided for Upper Archimedean screw pumps	Incl in M33.5
M33	Spares	M33-7	Bearing grease refills enough for 6 months for Upper Archimedean screw pumps	
M33	Spares	M33-31	Spare actuator to regulate diffuser vanes for each Blower supplied.	Incl in M8.1
M33	Spares	M33-32	Blower Oil Refill for the blowers supplied	
M33	Spares	M33-33	All special tools for blower maintenance	
M33	Spares	M33-35	Blower inlet filters - two per unit supplied fully sealed in original packaging.	
M33	Spares	M33-36	Acoustic enclosure cooling fan including motor	
M33	Spares	M33-158	complete engine fanbelt	N/A
M33	Spares	M33-159	complete air filter set	Incl in M33.152
M33	Spares	M33-161	complete oil filter set	
M34	Sundries	M34-14	Operational and Maintenance Training	Incl in M35.40
M35	Process Control Assistance, Maintenance and Training (Full Time)	M35-25	Gas holding tanks	Incl in M35.26
M36	Maintenance Inspection (Part Time)	M36-15	Gas holding tanks	Incl in M36.16
M36	Maintenance Inspection (Part Time)	M36-38	Anaerobic digesters	Incl in M36.40
M36	Maintenance Inspection (Part Time)	M36-39	Gas holding tanks	
M36	Maintenance Inspection (Part Time)	M36-62	Anaerobic digesters	Incl in M36.64
M36	Maintenance Inspection (Part Time)	M36-63	Gas holding tanks	
E20	Miscellaneous and Sundries	E20-6	Substation Automation	Incl in E20.5
E20	Miscellaneous and Sundries	E20-11	LV Switchgear, control assemblies and VFCs	Incl in E7.1 – E7.19
E20	Miscellaneous and Sundries	E20-13	Instrumentation	NIL
E20	Miscellaneous and Sundries	E20-14	PLCs and Control hardware and panels	Incl in E19.4 – E19.18
E20	Miscellaneous and Sundries	E20-15	PLCs and Control system: software and functionality	Incl in E19.4 – E19.18
E20	Miscellaneous and Sundries	E20-16	Instrumentation Junction Box, Valve Bank, Local Control Panel and Communication Panel Control Hardware and Steelwork	Incl in E15.1 – E15.24
E20	Miscellaneous and Sundries	E20-17	SCADA, Historian and Reporting	Incl in E18.1 – E18.4

Table 3: *Schedule of Quantities - Items with no associated description*

ScheduleNo.	**Schedule Description**	**Line-Item** Number	**Line-Item Description**
M5	Odour Control and Covers	M5-34	None provided.
Odour Control P&G's			

Table 4: *Schedule of Quantities — Excessively high tendered rates and lump sums*

ScheduleNo.	**Schedule Description**	Line Item Number	**Line-Item Description**
P&Gs	General Requirements and Conditions	P&Gs-1	Providing Performance Security

The manner in which the P&G schedule of quantities has been compiled does not allow for the separation of fixed and time related P&G's. Additionally, the structure of the P&G section is extremely concise and therefore the contractor included numerous items within the limited number of line items.

Within P&G Item -1 we can confirm that the following has been included and priced under this item.

1. Cost of the performance guarantee to be issued to the CoCT.
2. Costs for the Advance Payment Guarantees to be issued to the CoCT.
3. Costs for Performance Guarantees to be issued by suppliers to the Contractor, as appropriate.
4. Costs for Advance Payment Guarantees to be issued by suppliers to the Contractor, as appropriate.
5. Costs of Letters of Credit to overseas suppliers.
6. Costs associated with facilities and the backing thereof, specifically for procuring forward exchange contracts on overseas suppliers as per the requirements of the contract.
7. Costs associated with financing WIP (work in progress), both internally and for external manufacturer, this includes extensive MV equipment supply.

Of the total tendered amount for Item P&Gs - 1 i.e. R98,222,976.65, the time related portion is R 59, 501,735.92 whilst the fixed amount is R38,721,240.73

P&Gs	General Requirements and Conditions	P&Gs-2	Providing Insurances

The manner in which the P&G schedule of quantities has been compiled does not allow for the separation of fixed and time related P&G's. Additionally, the structure of the P&G section is extremely concise and therefore the contractor included numerous items within the limited number of line items.

Within P&G Item -2 we can confirm that the following has been included and priced under this item.

1. Cost of Contractors All Risk insurance policy as per the requirements of the Contract.
2. Insurance of imported equipment which is excluded from the Contractors All Risk insurance policy.
3. Cost of Public Liability Insurance as per the requirements of the Contract.
4. Cost of Professional Indemnity.
5. Insurance of Plant and Equipment.
6.

Of the total tendered amount for Item P&Gs – 2 i.e. R 40,269,872.43 the time related portion is R 31 843 909.16 whilst the fixed amount is R 8,425,963.27.

[redacted]

M34	Sundries	M34-12	Cost of fuel (Diesel) for up to 6 hours per day (including delivery) for the duration of pre-commissioning, commissioning and Trial operation period

As per the Detailed Electrical Specification 20.3, the standby generators will operate under a 5-duty, 1-standby protocol. At Loadshedding Stage 3, which we consider a realistic worst-case scenario, the plant will need to be powered for a minimum of 6 hours per day.

This will involve 5 duty generators running for 6 hours daily, over a period of 30 days per month average, for a total of 8 months (7 months for the commissioning of Phases 1 and 2, plus 1 month for TOP). As per note 2 Page 713-h of Addendum 3, commissioning during months 37-43 and TOP in month 44.

Fuel consumption is estimated at approximately 260 litres per hour per generator, at 72.5% load, resulting in a total of 1,871,510 litres required for the standby generators.

The boilers will involve 1 duty unit over a period of 30 days per month average, for a total of 3 months making a total of 37,800 litres required.

The diesel fuel sell rate of R25.86 per litre (Including overhead and profit) has been used for tender purposes.

It should further be noted that whilst the fuel price is subject to escalation in accordance with stipulated escalation formulae, the diesel fuel prices is extremely volatile and is subject to rate of exchange fluctuations and other critical market influences such as war and the like, with associated risk to price stability, therefore the rate provided allows a very small contingency.

E9	Cable Supports	E9-1	Stainless steel 316 cable ladder, 2mm thick side rails,channel cross rungs at 300mm centres, complete with couplers, clamps, threaded rods, hangers, cantilevers, brackets etc. to fix to trusses, walls for large installations: All equipment associated with Inlet Works MCC 92EI03-PNL01

Inlet – Supply of the following hardware:

- Main Run: 455m (bends as required)
- Sub Run (at 50% of main run width): 911m (bends as required)
- Dropper per power user 2m
- Mounting Supports as required
- Rates include 316 SS Tray straight Ladder lengths, bends, tee, covers, Spring nut, Bot M8x40, hold down saddle & Splice Set as required

PST – Supply of the following hardware:

- Main Run: 310m (bends as required)
- Sub Run (at 50% of main run width): 620m (bends as required)
- Dropper per power user 2m
- Mounting Supports as required
- Rates include 316 SS Tray straight Ladder lengths, bends, tee, covers, Spring nut, Bot M8x40, hold down saddle & Splice Set as required

E9	Cable Supports	E9-2	Stainless steel 316 cable ladder, 2mm thick side rails, channel cross rungs at 300mm centres, complete with couplers, clamps, threaded rods, hangers, cantilevers, brackets etc. to fix to trusses, walls for large installations: All equipment associated with Bioreactor MCC 92EI04-PNL01

Bioreactor – Supply of the following hardware:

- Main Run: 1019m (bends as required)
- Sub Run (at 50% of main run width): 2039m (bends as required)
- Dropper per power user 2m
- Mounting Supports as required
- Rates include 316 SS Tray straight Ladder lengths, bends, tee, covers, Spring nut, Bot M8x40, Hold down saddle & Splice Set as required

E9	Cable Supports	E9-4	Stainless steel 316 cable ladder, 2mm thick side rails, channel cross rungs at 300mm centres, complete with couplers, clamps, threaded rods, hangers, cantilevers, brackets etc. to fix to trusses, walls for large installations: All equipment associated with Dewatering MCC 92EI01-PNL01

Dewatering – Supply of the following hardware:

- Main Run: 1071m (bends as required)
- Sub Run (at 50% of main run width): 2142m (bends as required)
- Dropper per power user 2m
- Mounting Supports as required
- Rates include 316 SS Tray straight Ladder lengths, bends, tee, covers, Spring nut, Bot M8x40, Hold down saddle & Splice Set as required

WAS – Supply of the following hardware:

- Main Run: 132m (bends as required)
- Sub Run (at 50% of main run width): 264m (bends as required)
- Dropper per power user 2m
- Mounting Supports as required
- Rates include 316 SS Tray straight Ladder lengths, bends, tee, covers, Spring nut, Bot M8x40, Hold down saddle & Splice Set as required

PS – Supply of the following hardware:

- Main Run: 418m (bends as required)
- Sub Run (at 50% of main run width): 837m (bends as required)
- Dropper per power user 2m
- Mounting Supports as required
- Rates include 316 SS Tray straight Ladder lengths, bends, tee, covers, Spring nut, Bot M8x40, Hold down saddle & Splice Set as required

[redacted]

E9	Cable Supports	E9-5	Stainless steel 316 cable ladder, 2mm thick side rails,channel cross rungs at 300mm centres, complete with couplers, clamps, threaded rods, hangers, cantilevers, brackets etc. to fix to trusses, walls for large installations: All equipment associated with Service Water MCC 92EI06-PNL01

Service – Supply of the following hardware:

- Main Run: 181m (bends as required)
- Sub Run (at 50% of main run width): 363m (bends as required)
- Dropper per power user 2m
- Mounting Supports as required
- Rates include 316 SS Tray straight Ladder lengths, bends, tee, covers, Spring nut, Bot M8x40, Hold down saddle & Splice Set as required

TSE – Supply of the following hardware:

- Main Run: 455m (bends as required)
- Sub Run (at 50% of main run width): 911m (bends as required)
- Dropper per power user 2m
- Mounting Supports as required
- Rates include 316 SS Tray straight Ladder lengths, bends, tee, covers, Spring nut, Bot M8x40, Hold down saddle & Splice Set as required

E9	Cable Supports	E9-6	Stainless steel 316 cable ladder, 2mm thick side rails,channel cross rungs at 300mm centres, complete with couplers, clamps, threaded rods, hangers, cantilevers, brackets etc. to fix to trusses, walls for large installations: All equipment associated with ultraviolet MCC 92EI02- PNL01

UV – Supply of the following hardware:

- Main Run: 167m (bends as required)
- Sub Run (at 50% of main run width): 335m (bends as required)
- Dropper per power user 2m
- Mounting Supports as required
- Rates include 316 SS Tray straight Ladder lengths, bends, tee, covers, Spring nut, Bot M8x40, Hold down saddle & Splice Set as required

SST – Supply of the following hardware:

- Main Run: 440m (bends as required)
- Sub Run (at 50% of main run width): 881m (bends as required)
- Dropper per power user 2m
- Mounting Supports as required
- Rates include 316 SS Tray straight Ladder lengths, bends, tee, covers, Spring nut, Bot M8x40, Hold down saddle & Splice Set as required

E9	Cable Supports	E9-8	Stainless steel 316 welded wire mesh cable tray, 50 x 50mm base aperture, 25 x 50mm side aperture, complete with splices, couplers, clamps, threaded rods, hangers, brackets etc. to fix to trusses, walls etc.for small installations: All equipment associated with Bioreactor MCC 92EI04-PNL01

Bioreactor – Supply of the following hardware:

- Main Run: 1334m (bends as required)
- Sub Run (at 50% of main run width): 574m (bends as required)
- Dropper per power user 1.5m
- Mounting Supports as required
- Rates include 316 SS Tray straight Tray lengths, bends, tee, covers, Spring nut, Bot M8x40, Hold down saddle & Splice Set as required

E9	Cable Supports	E9-10	Stainless steel 316 welded wire mesh cable tray, 50 x 50mm base aperture, 25 x 50mm side aperture, complete with splices, couplers, clamps, threaded rods, hangers, brackets etc. to fix to trusses, walls etc.for small installations: All equipment associated with Dewatering MCC 92EI01-PNL01

Dewatering – Supply of the following hardware:

- Main Run: 1563m (bends as required)
- Sub Run (at 50% of main run width): 960m (bends as required)
- Dropper per power user 1.5m
- Mounting Supports as required
- Rates include 316 SS Tray straight Tray lengths, bends, tee, covers, Spring nut, Bot M8x40, Hold down saddle & Splice Set as required

WAS – Supply of the following hardware:

- Main Run: 263m (bends as required)
- Sub Run (at 50% of main run width): 105m (bends as required)
- Dropper per power user 1.5m
- Mounting Supports as required
- Rates include 316 SS Tray straight Tray lengths, bends, tee, covers, Spring nut, Bot M8x40, Hold down saddle & Splice Set as required

PS – Supply of the following hardware:

- Main Run: 835m (bends as required)
- Sub Run (at 50% of main run width): 360m (bends as required)
- Dropper per power user 1.5m
- Mounting Supports as required
- Rates include 316 SS Tray straight Tray lengths, bends, tee, covers, Spring nut, Bot M8x40, Hold down saddle & Splice Set as required

[redacted]

E9	Cable Supports	E9-11	Stainless steel 316 welded wire mesh cable tray, 50 x 50mm base aperture, 25 x 50mm side aperture, complete with splices, couplers, clamps, threaded rods, hangers, brackets etc. to fix to trusses, walls etc. for small installations: All equipment associated with Service Water MCC 92EI06-PNL01

Service – Supply of the following hardware:

- Main Run: 487m (bends as required)
- Sub Run (at 50% of main run width): 270m (bends as required)
- Dropper per power user 1.5m
- Mounting Supports as required
- Rates include 316 SS Tray straight Tray lengths, bends, tee, covers, Spring nut, Bot M8x40, Hold down saddle & Splice Set as required

TSE – Supply of the following hardware:

- Main Run: 334m (bends as required)
- Sub Run (at 50% of main run width): 255m (bends as required)
- Dropper per power user 1.5m
- Mounting Supports as required
- Rates include 316 SS Tray straight Tray lengths, bends, tee, covers, Spring nut, Bot M8x40, Hold down saddle & Splice Set as required

E9	Cable Supports	E9-12	Stainless steel 316 welded wire mesh cable tray, 50 x 50mm base aperture, 25 x 50mm side aperture, complete with splices, couplers, clamps, threaded rods, hangers, brackets etc. to fix to trusses, walls etc. for small installations: All equipment associated with Ultraviolet MCC 92EI02-PNL01

UV – Supply of the following hardware:

- Main Run: 308m (bends as required)
- Sub Run (at 50% of main run width): 150m (bends as required)
- Dropper per power user 1.5m
- Mounting Supports as required
- Rates include 316 SS Tray straight Tray lengths, bends, tee, covers, Spring nut, Bot M8x40, Hold down saddle & Splice Set as required

SST – Supply of the following hardware:

- Main Run: 1049m (bends as required)
- Sub Run (at 50% of main run width): 495m (bends as required)
- Dropper per power user 1.5m
- Mounting Supports as required
- Rates include 316 SS Tray straight Tray lengths, bends, tee, covers, Spring nut, Bot M8x40, Hold down saddle & Splice Set as required

E9	Cable Supports	E9-14	Allow for all costs and expenses in connection with the installation of stainless steel 316 cable ladder, 3mm thick side rails, channel cross rungs at 300mm centres, complete with couplers, clamps, threaded rods, hangers, cantilevers, brackets etc. to fix to trusses, walls for large installations: All equipment associated with Bioreactor MCC 92EI04-PNL01

Bioreactor – installation of the following hardware:

- Main Run: 1019m (bends as required)
- Sub Run (at 50% of main run width): 2039m (bends as required)
- Dropper per power user 2m
- Mounting Supports as required
- Rates include 316 SS Tray straight Ladder lengths, bends, tee, covers, Spring nut, Bot M8x40, Hold down saddle & Splice Set as required

E9	Cable Supports	E9-16	Allow for all costs and expenses in connection with the installation with regards to Stainless steel 316 cable ladder, 3mm thick side rails, channel cross rungs at 300mm centres, complete with couplers, clamps, threaded rods, hangers, cantilevers, brackets etc. to fix to trusses, walls for large installations: All equipment associated with Dewatering MCC 92EI01-PNL01

Dewatering – installation of the following hardware:

- Main Run: 1019m (bends as required)
- Sub Run (at 50% of main run width): 2039m (bends as required)
- Dropper per power user 2m
- Mounting Supports as required
- Rates include 316 SS Tray straight Ladder lengths, bends, tee, covers, Spring nut, Bot M8x40, Hold down saddle & Splice Set as required

WAS – installation of the following hardware:

- Main Run: 132m (bends as required)
- Sub Run (at 50% of main run width): 264m (bends as required)
- Dropper per power user 2m
- Mounting Supports as required
- Rates include 316 SS Tray straight Ladder lengths, bends, tee, covers, Spring nut, Bot M8x40, Hold down saddle & Splice Set as required

PS – installation of the following hardware:

- Main Run: 418m (bends as required)
- Sub Run (at 50% of main run width): 837m (bends as required)
- Dropper per power user 2m
- Mounting Supports as required
- Rates include 316 SS Tray straight Ladder lengths, bends, tee, covers, Spring nut, Bot M8x40, Hold down saddle & Splice Set as required

[redacted]

E9	Cable Supports	E9-22	Allow for all costs and expenses in connection with the installation with regards to Stainless steel 316 welded wire mesh cable tray, 50 x 50mm base aperture, 25 x 50mm side aperture, complete with splices, couplers, clamps, threaded rods, hangers, brackets etc. to fix to trusses, walls etc. for small installations: All equipment associated with Dewatering MCC 92EI01-PNL01

Dewatering – installation of the following hardware:

- Main Run: 1563m (bends as required)
- Sub Run (at 50% of main run width): 960m (bends as required)
- Dropper per power user 1.5m
- Mounting Supports as required
- Rates include 316 SS Tray straight Tray lengths, bends, tee, covers, Spring nut, Bot M8x40, Hold down saddle & Splice Set as required

WAS – installation of the following hardware:

- Main Run: 263m (bends as required)
- Sub Run (at 50% of main run width): 105m (bends as required)
- Dropper per power user 1.5m
- Mounting Supports as required
- Rates include 316 SS Tray straight Tray lengths, bends, tee, covers, Spring nut, Bot M8x40, Hold down saddle & Splice Set as required

PS – installation of the following hardware:

- Main Run: 835m (bends as required)
- Sub Run (at 50% of main run width): 360m (bends as required)
- Dropper per power user 1.5m
- Mounting Supports as required
- Rates include 316 SS Tray straight Tray lengths, bends, tee, covers, Spring nut, Bot M8x40, Hold down saddle & Splice Set as required

E19	Programmable Logic Controller (PLC)	E19-1	PLC Software Licensing

The following packages have been offered

- SIRIUS Soft Starter ES V19 Professional floating license for 1 user license and software for download license key download
- SIRIUS SIMOCODE ES V19 Professional; floating license for one user; engineering software, license and software for download 6 languages
- SIMATIC STEP 7 Professional V19, floating license download; engineering software in the TIA Portal; software, documentation, and license key for download
- SIMATIC WinCC Unified V19 Comfort Engineering, engineering software in the TIA Portal; floating license; with software, documentation, and license key for download

E19	*Programmable Logic Controller (PLC)*	*E19-2*	Network Management Software Licensing

The following software packages have been offered

- LIC-MXviewOne-NEW-XN-SRMXview One node license – per node (estimated 314 switches)
- LIC-MXview-ADD-WIRELESS-MR

E19	*Programmable Logic Controller (PLC)*	*E19-3*	Condition Software Licensing

The following software packages have been offered

- RTM package License; licence for the software package for setting up a condition monitoring application; download; package licence; full version
- EdgeConnect Agent License; Licence for communication with the ifm Agent software; download; single licence; full version
- LR agent (hosting of MQTT broker for Ignition subscription)
- INFOPOINT License; Licence for information points; download; single licence; full version

E19	*Programmable Logic Controller (PLC)*	*E19-4*	Inlet Works: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Double Door Hot-Standby - With HMI

Inlet Works – Supply of the following hardware:

The following is included:

- Control hardware
  - PLC – S7-1500 with ET200SP RIO (split between two PLC panels if required)
  - HMI if required - SIMATIC ITC1500 V3, Industrial Thin Client, 15" widescreen
- Switchgear and accessories
  - Breakers
  - Cooling fans
  - Supervisory layer ethernet switch as required
  - Control layer ethernet switch
  - Managed network switch
  - UPS with C/O and breakers
  - RTD to IO-link Converters
  - Terminals, trucking and relays
- IO offered for MCC (split between two PLC panels if required)

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	52	104	0	0	0	0	52
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	8	16	0	24	0	0	8
4		Motor Driven Equipment VSD	0	0	0	0	0	0	0
5		Incomer	3	12	6	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	45	270	90	0	0	0	0
9	**Base Requirement**			**484**	**99**	**24**	**0**	**0**	**60**
10	***Add Spare Capacity***		***30%***	***146***	***30***	***8***	***0***	***0***	***18***
11	**Total Requirement**			**630**	**129**	**32**	**0**	**0**	**0**

E19	*Programmable Logic Controller (PLC)*	*E19-5*	Inlet Works: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Double Door Hot-Standby - Without HMI

Inlet Works – Supply of the following hardware:
The following is included:

- Control hardware
  - PLC – S7-1500 with ET200SP RIO (split between two PLC panels if required)
- Switchgear and accessories
  - Breakers
  - Cooling fans
  - Supervisory layer ethernet switch as required
  - Control layer ethernet switch
  - Managed network switch
  - UPS with C/O and breakers
  - RTD to IO-link Converters
  - Terminals, trucking and relays
- IO offered for MCC (split between two PLC panels if required)

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	52	104	0	0	0	0	52
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	8	16	0	24	0	0	8
4		Motor Driven Equipment VSD	0	0	0	0	0	0	0
5		Incomer	3	12	6	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	45	270	90	0	0	0	0
9	**Base Requirement**			**484**	**99**	**24**	**0**	**0**	**60**
10	***Add Spare Capacity***		***30%***	***146***	***30***	***8***	***0***	***0***	***18***
11	**Total Requirement**			**630**	**129**	**32**	**0**	**0**	**0**

E19	*Programmable Logic Controller (PLC)*	*E19-6*	Bioreactor: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Double Door Standard PLC - With HMI

Bioreactor – Supply of the following hardware:
The following is included:

- Control hardware
  - PLC – S7-1500 with ET200SP RIO (split between two PLC panels if required)
  - HMI if required - SIMATIC ITC1500 V3, Industrial Thin Client, 15" widescreen
- Switchgear and accessories
  - Breakers
  - Cooling fans
  - Supervisory layer ethernet switch as required
  - Control layer ethernet switch
  - Managed network switch
  - UPS with C/O and breakers
  - RTD to IO-link Converters
  - Terminals, trucking and relays
- IO offered for MCC (split between two PLC panels if required)

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	49	98	0	0	0	0	49
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	12	36	0	0	0	0	12
4		Motor Driven Equipment VSD	9	18	0	0	0	0	9
5		Incomer	3	12	6	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	37	222	74	0	0	0	0
9	**Base Requirement**			**559**	**83**	**0**	**0**	**0**	**70**
10	***Add Spare Capacity***		***30%***	***168***	***25***	***0***	***0***	***0***	***21***
11	**Total Requirement**			***727***	***108***	***0***	***0***	***0***	***0***

E19	*Programmable Logic Controller (PLC)*	*E19-8*	Primary Settling PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI

Primary Settling – Supply of the following hardware:
The following is included:

- Control hardware
  - PLC – S7-1500 with ET200SP RIO
  - HMI if required - SIMATIC ITC1500 V3, Industrial Thin Client, 15" widescreen
- Switchgear and accessories
  - Breakers
  - Cooling fans
  - Supervisory layer ethernet switch as required
  - Control layer ethernet switch
  - Managed network switch
  - UPS with C/O and breakers
  - RTD to IO-link Converters
  - Terminals, trucking and relays
- IO offered for MCC

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	25	50	0	0	0	0	25
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	0	0	0	0	0	0	0
4		Motor Driven Equipment VSD	14	28	0	0	0	0	14
5		Incomer	1	4	2	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	8	48	16	0	0	0	0
9	**Base Requirement**			**133**	**21**	**0**	**0**	**0**	**39**
10	***Add Spare Capacity***		***30%***	***40***	***7***	***0***	***0***	***0***	***12***
11	**Total Requirement**			***173***	***28***	***0***	***0***	***0***	***0***

E19	*Programmable Logic Controller (PLC)*	*E19-9*	Secondary Settling: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI

Secondary Settling – Supply of the following hardware:
The following is included:

- Control hardware
  - PLC – S7-1500 with ET200SP RIO
  - HMI if required - SIMATIC ITC1500 V3, Industrial Thin Client, 15" widescreen
- Switchgear and accessories
  - Breakers
  - Cooling fans
  - Supervisory layer ethernet switch as required
  - Control layer ethernet switch
  - Managed network switch
  - UPS with C/O and breakers
  - RTD to IO-link Converters
  - Terminals, trucking and relays
- IO offered for MCC

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	19	38	0	0	0	0	19
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	0	0	0	0	0	0	0
4		Motor Driven Equipment VSD	2	4	0	0	0	0	2
5		Incomer	0	0	0	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	18	108	36	0	0	0	0
9	**Base Requirement**			**195**	**39**	**0**	**0**	**0**	**21**
10	***Add Spare Capacity***		***30%***	***59***	***12***	***0***	***0***	***0***	***7***
11	**Total Requirement**			***254***	***51***	***0***	***0***	***0***	***0***

E19	*Programmable Logic Controller (PLC)*	*E19-10*	Blower: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI

Blower – Supply of the following hardware:
The following is included:

- Control hardware
  - PLC – S7-1500 with ET200SP RIO
  - HMI if required - SIMATIC ITC1500 V3, Industrial Thin Client, 15" widescreen
- Switchgear and accessories
  - Breakers
  - Cooling fans
  - Supervisory layer ethernet switch as required
  - Control layer ethernet switch
  - Managed network switch
  - UPS with C/O and breakers
  - RTD to IO-link Converters
  - Terminals, trucking and relays
- IO offered for MCC

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	12	24	0	0	0	0	12
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	0	0	0	0	0	0	0
4		Motor Driven Equipment VSD	0	0	0	0	0	0	0
5		Incomer	3	12	6	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	0	0	0	0	0	0	0
9	**Base Requirement**			**39**	**9**	**21**	**0**	**0**	**12**
10	***Add Spare Capacity***		***30%***	***12***	***3***	***7***	***0***	***0***	***4***
11	**Total Requirement**			***51***	***12***	***28***	***0***	***0***	***0***

[redacted]

E19	*Programmable Logic Controller (PLC)*	*E19-11*	Dewatering: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Double Door Standard PLC - With HMI

Dewatering – Supply of the following hardware:
The following is included:

- Control hardware
  - PLC – S7-1500 with ET200SP RIO (split between two PLC panels if required)
  - HMI if required - SIMATIC ITC1500 V3, Industrial Thin Client, 15" widescreen
- Switchgear and accessories
  - Breakers
  - Cooling fans
  - Supervisory layer ethernet switch as required
  - Control layer ethernet switch
  - Managed network switch
  - UPS with C/O and breakers
  - RTD to IO-link Converters
  - Terminals, trucking and relays
- IO offered for MCC (split between two PLC panels if required)

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	58	116	0	0	0	0	58
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	0	0	0	0	0	0	0
4		Motor Driven Equipment VSD	55	110	0	0	0	0	55
5		Incomer	3	12	6	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	58	348	116	0	0	0	0
9	**Base Requirement**			**676**	**125**	**0**	**0**	**0**	**113**
10	***Add Spare Capacity***		***30%***	***203***	***38***	***0***	***0***	***0***	***34***
11	**Total Requirement**			***879***	***163***	***0***	***0***	***0***	***0***

E19	*Programmable Logic Controller (PLC)*	*E19-12*	Dewatering: PLC Panel (E Excluding xcl Steel Work) - Main PLC Panel Type Double Door No PLC - Without HMI

Dewatering – Supply of the following hardware:

The following is included:

- Control hardware
  - PLC – S7-1500 with ET200SP RIO (split between two PLC panels if required)
- Switchgear and accessories
  - Breakers
  - Cooling fans
  - Supervisory layer ethernet switch as required
  - Control layer ethernet switch
  - Managed network switch
  - UPS with C/O and breakers
  - RTD to IO-link Converters
  - Terminals, trucking and relays
- IO offered for MCC (split between two PLC panels if required)

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	58	116	0	0	0	0	58
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	0	0	0	0	0	0	0
4		Motor Driven Equipment VSD	55	110	0	0	0	0	55
5		Incomer	3	12	6	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	58	348	116	0	0	0	0
9	**Base Requirement**			**676**	**125**	**0**	**0**	**0**	**113**
10	***Add Spare Capacity***		***30%***	***203***	***38***	***0***	***0***	***0***	***34***
11	**Total Requirement**			***879***	***163***	***0***	***0***	***0***	***0***

[redacted]

E19	*Programmable Logic Controller (PLC)*	*E19-13*	Primary Sludge: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - Without HMI

Primary Sludge – Supply of the following hardware:
The following is included:

- Control hardware
  - PLC – S7-1500 with ET200SP RIO (split between two PLC panels if required)
- Switchgear and accessories
  - Breakers
  - Cooling fans
  - Supervisory layer ethernet switch as required
  - Control layer ethernet switch
  - Managed network switch
  - UPS with C/O and breakers
  - RTD to IO-link Converters
  - Terminals, trucking and relays
- IO offered for MCC

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	4	8	0	0	0	0	4
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	0	0	0	0	0	0	0
4		Motor Driven Equipment VSD	4	8	0	0	0	0	4
5		Incomer	1	4	2	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	8	48	16	0	0	0	0
9	**Base Requirement**			**71**	**21**	**0**	**0**	**0**	**8**
10	***Add Spare Capacity***		***30%***	***22***	***7***	***0***	***0***	***0***	***3***
11	**Total Requirement**			***93***	***28***	***0***	***0***	***0***	***0***

[redacted]

E19	*Programmable Logic Controller (PLC)*	*E19-14*	Waste Activated Sludge: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - Without HMI

Waste Activated Sludge – Supply of the following hardware:
The following is included:

- Control hardware
  - PLC – S7-1500 with ET200SP RIO (split between two PLC panels if required)
- Switchgear and accessories
  - Breakers
  - Cooling fans
  - Supervisory layer ethernet switch as required
  - Control layer ethernet switch
  - Managed network switch
  - UPS with C/O and breakers
  - RTD to IO-link Converters
  - Terminals, trucking and relays
- IO offered for MCC

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	2	4	0	0	0	0	2
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	0	0	0	0	0	0	0
4		Motor Driven Equipment VSD	6	12	0	0	0	0	6
5		Incomer	1	4	2	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	10	60	20	0	0	0	0
9	**Base Requirement**			**90**	**25**	**0**	**0**	**0**	**8**
10	***Add Spare Capacity***		***30%***	***27***	***8***	***0***	***0***	***0***	***3***
11	**Total Requirement**			***117***	***33***	***0***	***0***	***0***	***0***

E19	*Programmable Logic Controller (PLC)*	*E19-15*	Service Water: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI

Service Water – Supply of the following hardware:
The following is included:

- Control hardware
  - PLC – S7-1500 with ET200SP RIO (split between two PLC panels if required)
  - HMI if required - SIMATIC ITC1500 V3, Industrial Thin Client, 15" widescreen
- Switchgear and accessories
  - Breakers
  - Cooling fans
  - Supervisory layer ethernet switch as required
  - Control layer ethernet switch
  - Managed network switch
  - UPS with C/O and breakers
  - RTD to IO-link Converters
  - Terminals, trucking and relays
- IO offered for MCC

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	11	22	0	0	0	0	11
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	0	0	0	0	0	0	0
4		Motor Driven Equipment VSD	7	14	0	0	0	0	7
5		Incomer	3	12	6	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	1	6	2	0	0	0	0
9	**Base Requirement**			**150**	**11**	**0**	**0**	**0**	**18**
10	***Add Spare Capacity***		***30%***	***45***	***4***	***0***	***0***	***0***	***6***
11	**Total Requirement**			***195***	***15***	***0***	***0***	***0***	***0***

E19	*Programmable Logic Controller (PLC)*	*E19-16*	Service Water: Conditional Monitoring Equipment

Service Water – Supply of the following hardware:
The following is included:

- Control hardware - VSE950
- Switchgear and accessories
  - Breakers
  - Surge Protection Type 2
  - Managed network switch
  - Terminals, trucking and relays

E19	*Programmable Logic Controller (PLC)*	*E19-17*	TSE Pump Station: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI

TSE Pump Station – Supply of the following hardware:
The following is included:

- Control hardware
  - PLC – S7-1500 with ET200SP RIO (split between two PLC panels if required)
  - HMI if required - SIMATIC ITC1500 V3, Industrial Thin Client, 15" widescreen
- Switchgear and accessories
  - Breakers
  - Cooling fans
  - Supervisory layer ethernet switch as required
  - Control layer ethernet switch
  - Managed network switch
  - UPS with C/O and breakers
  - RTD to IO-link Converters
  - Terminals, trucking and relays
- IO offered for MCC

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	10	20	0	0	0	0	10
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	0	0	0	0	0	0	0
4		Motor Driven Equipment VSD	7	14	0	0	0	0	7
5		Incomer	1	4	2	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	2	0	0	0	0	0	2
9	**Base Requirement**			**41**	**5**	**19**	**0**	**0**	**19**
10	***Add Spare Capacity***		***30%***	***13***	***2***	***6***	***0***	***0***	***6***
11	**Total Requirement**			***54***	***7***	***25***	***0***	***0***	***0***

[redacted]

E19	*Programmable Logic Controller (PLC)*	*E19-18*	TSE Pump Station: Conditional Monitoring Equipment

TSE Pump Station – Supply of the following hardware:
The following is included:

- Control hardware - VSE950
- Switchgear and accessories
  - Breakers
  - Surge Protection Type 2
  - Managed network switch
  - Terminals, trucking and relays

E19	*Programmable Logic Controller (PLC)*	*E19-19*	Allow for all costs and expenses in connection with the installation of the Inlet Works: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Double Door Hot-Standby - With HMI

Inlet Works – Installation of the following hardware:
The following is included:

- Control hardware
  - PLC – S7-1500 with ET200SP RIO (split between two PLC panels if required)
  - HMI if required - SIMATIC ITC1500 V3, Industrial Thin Client, 15" widescreen
- Switchgear and accessories
  - Breakers
  - Cooling fans
  - Supervisory layer ethernet switch as required
  - Control layer ethernet switch
  - Managed network switch
  - UPS with C/O and breakers
  - RTD to IO-link Converters
  - Terminals, trucking and relays
- IO offered for MCC (split between two PLC panels if required)

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	52	104	0	0	0	0	52
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	8	16	0	24	0	0	8
4		Motor Driven Equipment VSD	0	0	0	0	0	0	0
5		Incomer	3	12	6	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	45	270	90	0	0	0	0
9	**Base Requirement**			**484**	**99**	**24**	**0**	**0**	**60**
10	***Add Spare Capacity***		***30%***	***146***	***30***	***8***	***0***	***0***	***18***
11	**Total Requirement**			**630**	**129**	**32**	**0**	**0**	**0**

[redacted]

E19	*Programmable Logic Controller (PLC)*	*E19-20*	Allow for all costs and expenses in connection with the installation of the Inlet Works: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Double Door Hot-Standby - Without HMI

Inlet Works – Installation of the following hardware:
The following is included:

- Control hardware
  - PLC – S7-1500 with ET200SP RIO (split between two PLC panels if required)
- Switchgear and accessories
  - Breakers
  - Cooling fans
  - Supervisory layer ethernet switch as required
  - Control layer ethernet switch
  - Managed network switch
  - UPS with C/O and breakers
  - RTD to IO-link Converters
  - Terminals, trucking and relays
- IO offered for MCC (split between two PLC panels if required)

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	52	104	0	0	0	0	52
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	8	16	0	24	0	0	8
4		Motor Driven Equipment VSD	0	0	0	0	0	0	0
5		Incomer	3	12	6	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	45	270	90	0	0	0	0
9	**Base Requirement**			**484**	**99**	**24**	**0**	**0**	**60**
10	***Add Spare Capacity***		***30%***	***146***	***30***	***8***	***0***	***0***	***18***
11	**Total Requirement**			**630**	**129**	**32**	**0**	**0**	**0**

E19	*Programmable Logic Controller (PLC)*	*E19-21*	Allow for all costs and expenses in connection with the installation of the Inlet Works: PLC Software Development

Development of URS and software development of PLC, RIO and IPC according to the following IO Count

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	52	104	0	0	0	0	52
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	8	16	0	24	0	0	8
4		Motor Driven Equipment VSD	0	0	0	0	0	0	0
5		Incomer	3	12	6	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	45	270	90	0	0	0	0
9	**Base Requirement**			**484**	**99**	**24**	**0**	**0**	**60**
10	***Add Spare Capacity***		***30%***	***146***	***30***	***8***	***0***	***0***	***18***
11	**Total Requirement**			**630**	**129**	**32**	**0**	**0**	**0**

[redacted]

E19	*Programmable Logic Controller (PLC)*	*E19-22*	Allow for all costs and expenses in connection with the installation of the Bioreactor: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Double Door Standard PLC - With HMI

Bioreactor – Installation of the following hardware:
The following is included:

- Control hardware
  - PLC – S7-1500 with ET200SP RIO (split between two PLC panels if required)
  - HMI if required - SIMATIC ITC1500 V3, Industrial Thin Client, 15" widescreen
- Switchgear and accessories
  - Breakers
  - Cooling fans
  - Supervisory layer ethernet switch as required
  - Control layer ethernet switch
  - Managed network switch
  - UPS with C/O and breakers
  - RTD to IO-link Converters
  - Terminals, trucking and relays
- IO offered for MCC (split between two PLC panels if required)

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	49	98	0	0	0	0	49
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	12	36	0	0	0	0	12
4		Motor Driven Equipment VSD	9	18	0	0	0	0	9
5		Incomer	3	12	6	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	37	222	74	0	0	0	0
9	**Base Requirement**			**559**	**83**	**0**	**0**	**0**	**70**
10	***Add Spare Capacity***		***30%***	***168***	***25***	***0***	***0***	***0***	***21***
11	**Total Requirement**			***727***	***108***	***0***	***0***	***0***	***0***

[redacted]

E19	*Programmable Logic Controller (PLC)*	*E19-23*	Allow for all costs and expenses in connection with the installation of the Bioreactor: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Double Door No PLC - Without HMI

Bioreactor – Installation of the following hardware:
The following is included:

- Control hardware
  - PLC – S7-1500 with ET200SP RIO (split between two PLC panels if required)
- Switchgear and accessories
  - Breakers
  - Cooling fans
  - Supervisory layer ethernet switch as required
  - Control layer ethernet switch
  - Managed network switch
  - UPS with C/O and breakers
  - RTD to IO-link Converters
  - Terminals, trucking and relays
- IO offered for MCC (split between two PLC panels if required)

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	49	98	0	0	0	0	49
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	12	36	0	0	0	0	12
4		Motor Driven Equipment VSD	9	18	0	0	0	0	9
5		Incomer	3	12	6	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	37	222	74	0	0	0	0
9	**Base Requirement**			**559**	**83**	**0**	**0**	**0**	**70**
10	***Add Spare Capacity***		***30%***	***168***	***25***	***0***	***0***	***0***	***21***
11	**Total Requirement**			***727***	***108***	***0***	***0***	***0***	***0***

E19	*Programmable Logic Controller (PLC)*	*E19-24*	Allow for all costs and expenses in connection with the installation of the Bioreactor: PLC Software Development

Development of URS and software development of PLC, RIO and IPC according to the following IO Count

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	49	98	0	0	0	0	49
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	12	36	0	0	0	0	12
4		Motor Driven Equipment VSD	9	18	0	0	0	0	9
5		Incomer	3	12	6	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	37	222	74	0	0	0	0
9	**Base Requirement**			**559**	**83**	**0**	**0**	**0**	**70**
10	***Add Spare Capacity***		***30%***	***168***	***25***	***0***	***0***	***0***	***21***
11	**Total Requirement**			***727***	***108***	***0***	***0***	***0***	***0***

[redacted]

E19	*Programmable Logic Controller (PLC)*	*E19-25*	Allow for all costs and expenses in connection with the installation of the Primary Settling PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI

Primary Settling – Installation of the following hardware:
The following is included:

- Control hardware
  - PLC – S7-1500 with ET200SP RIO
  - HMI if required - SIMATIC ITC1500 V3, Industrial Thin Client, 15" widescreen
- Switchgear and accessories
  - Breakers
  - Cooling fans
  - Supervisory layer ethernet switch as required
  - Control layer ethernet switch
  - Managed network switch
  - UPS with C/O and breakers
  - RTD to IO-link Converters
  - Terminals, trucking and relays
- IO offered for MCC

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	25	50	0	0	0	0	25
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	0	0	0	0	0	0	0
4		Motor Driven Equipment VSD	14	28	0	0	0	0	14
5		Incomer	1	4	2	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	8	48	16	0	0	0	0
9	**Base Requirement**			**133**	**21**	**0**	**0**	**0**	**39**
10	***Add Spare Capacity***		***30%***	***40***	***7***	***0***	***0***	***0***	***12***
11	**Total Requirement**			***173***	***28***	***0***	***0***	***0***	***0***

E19	*Programmable Logic Controller (PLC)*	*E19-26*	Allow for all costs and expenses in connection with the installation of the Primary Settling PLC Software Development

Development of URS and software development of PLC, RIO and IPC according to the following IO Count

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	25	50	0	0	0	0	25
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	0	0	0	0	0	0	0
4		Motor Driven Equipment VSD	14	28	0	0	0	0	14
5		Incomer	1	4	2	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	8	48	16	0	0	0	0
9	**Base Requirement**			**133**	**21**	**0**	**0**	**0**	**39**
10	***Add Spare Capacity***		***30%***	***40***	***7***	***0***	***0***	***0***	***12***
11	**Total Requirement**			***173***	***28***	***0***	***0***	***0***	***0***

E19	*Programmable Logic Controller (PLC)*	*E19-27*	Allow for all costs and expenses in connection with the installation of the Secondary Settling: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI

Secondary Settling – Installation of the following hardware:
The following is included:

- Control hardware
  - PLC – S7-1500 with ET200SP RIO
  - HMI if required - SIMATIC ITC1500 V3, Industrial Thin Client, 15" widescreen
- Switchgear and accessories
  - Breakers
  - Cooling fans
  - Supervisory layer ethernet switch as required
  - Control layer ethernet switch
  - Managed network switch
  - UPS with C/O and breakers
  - RTD to IO-link Converters
  - Terminals, trucking and relays
- IO offered for MCC

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	19	38	0	0	0	0	19
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	0	0	0	0	0	0	0
4		Motor Driven Equipment VSD	2	4	0	0	0	0	2
5		Incomer	0	0	0	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	18	108	36	0	0	0	0
9	**Base Requirement**			**195**	**39**	**0**	**0**	**0**	**21**
10	***Add Spare Capacity***		***30%***	***59***	***12***	***0***	***0***	***0***	***7***
11	**Total Requirement**			***254***	***51***	***0***	***0***	***0***	***0***

E19	*Programmable Logic Controller (PLC)*	*E19-28*	Allow for all costs and expenses in connection with the installation of the Secondary Settling: PLC Software Development

Development of URS and software development of PLC, RIO and IPC according to the following IO Count

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	19	38	0	0	0	0	19
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	0	0	0	0	0	0	0
4		Motor Driven Equipment VSD	2	4	0	0	0	0	2
5		Incomer	0	0	0	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	18	108	36	0	0	0	0
9	**Base Requirement**			**195**	**39**	**0**	**0**	**0**	**21**
10	***Add Spare Capacity***		***30%***	***59***	***12***	***0***	***0***	***0***	***7***
11	**Total Requirement**			***254***	***51***	***0***	***0***	***0***	***0***

E19	*Programmable Logic Controller (PLC)*	*E19-29*	Allow for all costs and expenses in connection with the installation of the Blower: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI

Blower – Installation of the following hardware:
The following is included:

- Control hardware
  - PLC – S7-1500 with ET200SP RIO
  - HMI if required - SIMATIC ITC1500 V3, Industrial Thin Client, 15" widescreen
- Switchgear and accessories
  - Breakers
  - Cooling fans
  - Supervisory layer ethernet switch as required
  - Control layer ethernet switch
  - Managed network switch
  - UPS with C/O and breakers
  - RTD to IO-link Converters
  - Terminals, trucking and relays
- IO offered for MCC

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	12	24	0	0	0	0	12
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	0	0	0	0	0	0	0
4		Motor Driven Equipment VSD	0	0	0	0	0	0	0
5		Incomer	3	12	6	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	0	0	0	0	0	0	0
9	**Base Requirement**			**39**	**9**	**21**	**0**	**0**	**12**
10	***Add Spare Capacity***		***30%***	***12***	***3***	***7***	***0***	***0***	***4***
11	**Total Requirement**			***51***	***12***	***28***	***0***	***0***	***0***

[redacted]

E19	*Programmable Logic Controller (PLC)*	*E19-30*	Allow for all costs and expenses in connection with the installation of the Blower: Conditional Monitoring Equipment

Development of URS and software development of PLC, RIO and IPC according to the following IO Count

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	12	24	0	0	0	0	12
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	0	0	0	0	0	0	0
4		Motor Driven Equipment VSD	0	0	0	0	0	0	0
5		Incomer	3	12	6	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	0	0	0	0	0	0	0
9	**Base Requirement**			**39**	**9**	**21**	**0**	**0**	**12**
10	***Add Spare Capacity***		***30%***	***12***	***3***	***7***	***0***	***0***	***4***
11	**Total Requirement**			***51***	***12***	***28***	***0***	***0***	***0***

E19	*Programmable Logic Controller (PLC)*	*E19-31*	Allow for all costs and expenses in connection with the installation of the Dewatering: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Double Door No PLC - Without HMI

Development of URS and software development of PLC, RIO and IPC according to the following IO Count

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	12	24	0	0	0	0	12
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	0	0	0	0	0	0	0
4		Motor Driven Equipment VSD	0	0	0	0	0	0	0
5		Incomer	3	12	6	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	0	0	0	0	0	0	0
9	**Base Requirement**			**39**	**9**	**21**	**0**	**0**	**12**
10	***Add Spare Capacity***		***30%***	***12***	***3***	***7***	***0***	***0***	***4***
11	**Total Requirement**			***51***	***12***	***28***	***0***	***0***	***0***

[redacted]

E19	*Programmable Logic Controller (PLC)*	*E19-32*	Allow for all costs and expenses in connection with the installation of the Dewatering: PLC Software Development

Development of URS and software development of PLC, RIO and IPC according to the following IO Count

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	58	116	0	0	0	0	58
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	0	0	0	0	0	0	0
4		Motor Driven Equipment VSD	55	110	0	0	0	0	55
5		Incomer	3	12	6	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	58	348	116	0	0	0	0
9	**Base Requirement**			**676**	**125**	**0**	**0**	**0**	**113**
10	***Add Spare Capacity***		***30%***	***203***	***38***	***0***	***0***	***0***	***34***
11	**Total Requirement**			***879***	***163***	***0***	***0***	***0***	***0***

E19	*Programmable Logic Controller (PLC)*	*E19-33*	Allow for all costs and expenses in connection with the installation of the Primary Sludge: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - Without HMI

Primary Sludge – Installation of the following hardware:
The following is included:

- Control hardware
  - PLC – S7-1500 with ET200SP RIO (split between two PLC panels if required)
- Switchgear and accessories
  - Breakers
  - Cooling fans
  - Supervisory layer ethernet switch as required
  - Control layer ethernet switch
  - Managed network switch
  - UPS with C/O and breakers
  - RTD to IO-link Converters
  - Terminals, trucking and relays
- IO offered for MCC

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	4	8	0	0	0	0	4
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	0	0	0	0	0	0	0
4		Motor Driven Equipment VSD	4	8	0	0	0	0	4
5		Incomer	1	4	2	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	8	48	16	0	0	0	0
9	**Base Requirement**			**71**	**21**	**0**	**0**	**0**	**8**
10	***Add Spare Capacity***		***30%***	***22***	***7***	***0***	***0***	***0***	***3***
11	**Total Requirement**			***93***	***28***	***0***	***0***	***0***	***0***

[redacted]

E19	*Programmable Logic Controller (PLC)*	*E19-34*	Allow for all costs and expenses in connection with the installation of the Primary Sludge: PLC Software Development

Development of URS and software development of PLC, RIO and IPC according to the following IO Count

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	4	8	0	0	0	0	4
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	0	0	0	0	0	0	0
4		Motor Driven Equipment VSD	4	8	0	0	0	0	4
5		Incomer	1	4	2	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	8	48	16	0	0	0	0
9	**Base Requirement**			**71**	**21**	**0**	**0**	**0**	**8**
10	***Add Spare Capacity***		***30%***	***22***	***7***	***0***	***0***	***0***	***3***
11	**Total Requirement**			***93***	***28***	***0***	***0***	***0***	***0***

E19	*Programmable Logic Controller (PLC)*	*E19-35*	Allow for all costs and expenses in connection with the installation of the Waste Activated Sludge: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - Without HMI

Waste Activated Sludge – Installation of the following hardware:
The following is included:

- Control hardware
  - PLC – S7-1500 with ET200SP RIO (split between two PLC panels if required)
- Switchgear and accessories
  - Breakers
  - Cooling fans
  - Supervisory layer ethernet switch as required
  - Control layer ethernet switch
  - Managed network switch
  - UPS with C/O and breakers
  - RTD to IO-link Converters
  - Terminals, trucking and relays
- IO offered for MCC

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	2	4	0	0	0	0	2
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	0	0	0	0	0	0	0
4		Motor Driven Equipment VSD	6	12	0	0	0	0	6
5		Incomer	1	4	2	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	10	60	20	0	0	0	0
9	**Base Requirement**			**90**	**25**	**0**	**0**	**0**	**8**
10	***Add Spare Capacity***		***30%***	***27***	***8***	***0***	***0***	***0***	***3***
11	**Total Requirement**			***117***	***33***	***0***	***0***	***0***	***0***

[redacted]

E19	*Programmable Logic Controller (PLC)*	*E19-36*	Allow for all costs and expenses in connection with the installation of the Waste Activated Sludge: PLC Software Development

Development of URS and software development of PLC, RIO and IPC according to the following IO Count

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	2	4	0	0	0	0	2
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	0	0	0	0	0	0	0
4		Motor Driven Equipment VSD	6	12	0	0	0	0	6
5		Incomer	1	4	2	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	10	60	20	0	0	0	0
9	**Base Requirement**			**90**	**25**	**0**	**0**	**0**	**8**
10	***Add Spare Capacity***		***30%***	***27***	***8***	***0***	***0***	***0***	***3***
11	**Total Requirement**			***117***	***33***	***0***	***0***	***0***	***0***

E19	*Programmable Logic Controller (PLC)*	*E19-37*	Allow for all costs and expenses in connection with the installation of the Ultraviolet Filtration: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI

Ultra Violet Filtration – Installation of the following hardware:
The following is included:

- Control hardware
  - PLC – S7-1500 with ET200SP RIO (split between two PLC panels if required)
  - HMI if required - SIMATIC ITC1500 V3, Industrial Thin Client, 15" widescreen
- Switchgear and accessories
  - Breakers
  - Cooling fans
  - Supervisory layer ethernet switch as required
  - Control layer ethernet switch
  - Managed network switch
  - UPS with C/O and breakers
  - RTD to IO-link Converters
  - Terminals, trucking and relays
- IO offered for MCC

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	28	56	0	0	0	0	28
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	0	0	0	0	0	0	0
4		Motor Driven Equipment VSD	0	0	0	0	0	0	0
5		Incomer	3	12	6	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	8	48	16	0	0	0	0
9	**Base Requirement**			**134**	**25**	**0**	**0**	**0**	**28**
10	***Add Spare Capacity***		***30%***	***41***	***8***	***0***	***0***	***0***	***9***
11	**Total Requirement**			***175***	***33***	***0***	***0***	***0***	***0***

[redacted]

E19	*Programmable Logic Controller (PLC)*	*E19-38*	Allow for all costs and expenses in connection with the installation of the Ultraviolet Filtration: PLC Software Development

Development of URS and software development of PLC, RIO and IPC according to the following IO Count

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	28	56	0	0	0	0	28
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	0	0	0	0	0	0	0
4		Motor Driven Equipment VSD	0	0	0	0	0	0	0
5		Incomer	3	12	6	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	8	48	16	0	0	0	0
9	**Base Requirement**			**134**	**25**	**0**	**0**	**0**	**28**
10	***Add Spare Capacity***		***30%***	***41***	***8***	***0***	***0***	***0***	***9***
11	**Total Requirement**			***175***	***33***	***0***	***0***	***0***	***0***

E19	*Programmable Logic Controller (PLC)*	*E19-39*	Allow for all costs and expenses in connection with the installation of the Service Water: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI

Service Water – Installation of the following hardware:
The following is included:

- Control hardware
  - PLC – S7-1500 with ET200SP RIO (split between two PLC panels if required)
  - HMI if required - SIMATIC ITC1500 V3, Industrial Thin Client, 15" widescreen
- Switchgear and accessories
  - Breakers
  - Cooling fans
  - Supervisory layer ethernet switch as required
  - Control layer ethernet switch
  - Managed network switch
  - UPS with C/O and breakers
  - RTD to IO-link Converters
  - Terminals, trucking and relays
- IO offered for MCC

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	11	22	0	0	0	0	11
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	0	0	0	0	0	0	0
4		Motor Driven Equipment VSD	7	14	0	0	0	0	7
5		Incomer	3	12	6	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	1	6	2	0	0	0	0
9	**Base Requirement**			**150**	**11**	**0**	**0**	**0**	**18**
10	***Add Spare Capacity***		***30%***	***45***	***4***	***0***	***0***	***0***	***6***
11	**Total Requirement**			***195***	***15***	***0***	***0***	***0***	***0***

E19	*Programmable Logic Controller (PLC)*	*E19-40*	Allow for all costs and expenses in connection with the installation of the Service Water: Conditional Monitoring Equipment

Service Water – Installation of the following hardware:
The following is included:

- Control hardware - VSE950
- Switchgear and accessories
  - Breakers
  - Surge Protection Type 2
  - Managed network switch
  - Terminals, trucking and relays

E19	*Programmable Logic Controller (PLC)*	*E19-41*	Allow for all costs and expenses in connection with the installation of the Service Water: PLC Software Development

Development of URS and software development of PLC, RIO and IPC according to the following IO Count

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	11	22	0	0	0	0	11
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	0	0	0	0	0	0	0
4		Motor Driven Equipment VSD	7	14	0	0	0	0	7
5		Incomer	3	12	6	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	1	6	2	0	0	0	0
9	**Base Requirement**			**150**	**11**	**0**	**0**	**0**	**18**
10	***Add Spare Capacity***		***30%***	***45***	***4***	***0***	***0***	***0***	***6***
11	**Total Requirement**			***195***	***15***	***0***	***0***	***0***	***0***

[redacted]

E19	*Programmable Logic Controller (PLC)*	*E19-42*	Allow for all costs and expenses in connection with the installation of the TSE Pump Station: PLC Panel (Excluding Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI

TSE Pump Station – Installation of the following hardware:
The following is included:

- Control hardware
  - PLC – S7-1500 with ET200SP RIO (split between two PLC panels if required)
  - HMI if required - SIMATIC ITC1500 V3, Industrial Thin Client, 15" widescreen
- Switchgear and accessories
  - Breakers
  - Cooling fans
  - Supervisory layer ethernet switch as required
  - Control layer ethernet switch
  - Managed network switch
  - UPS with C/O and breakers
  - RTD to IO-link Converters
  - Terminals, trucking and relays
- IO offered for MCC

Item		Description	Qty	DIN	DOU	AIN	AOU	Other	Comms
1	Starters	Motor Driven Equipment DOL	10	20	0	0	0	0	10
2		Motor Driven Equipment Dosing	0	0	0	0	0	0	0
3		Motor Driven Equipment SS	0	0	0	0	0	0	0
4		Motor Driven Equipment VSD	7	14	0	0	0	0	7
5		Incomer	1	4	2	0	0	0	0
6		Solid State Relays	0	0	0	0	0	0	0
7		MCC E-Stop, Pushbuttons, Selectors, Pilot Lights, Alarm Modules, Safety, PTC	6	3	3	0	0	0	0
8	Field	Equipment: Instruments & Valves	2	0	0	0	0	0	2
9	**Base Requirement**			**41**	**5**	**19**	**0**	**0**	**19**
10	***Add Spare Capacity***		***30%***	***13***	***2***	***6***	***0***	***0***	***6***
11	**Total Requirement**			***54***	***7***	***25***	***0***	***0***	***0***

[redacted]

E19	*Programmable Logic Controller (PLC)*	*E19-43*	Allow for all costs and expenses in connection with the installation of the TSE Pump Station: Conditional Monitoring Equipment
TSE Pump Station – Installation of the following hardware: The following is included: • Control hardware - VSE950 • Switchgear and accessories o Breakers o Surge Protection Type 2 o Managed network switch o Terminals, trucking and relays			
E19	*Programmable Logic Controller (PLC)*	*E19-44*	Allow for all costs and expenses in connection with the installation of the TSE Pump Station: PLC Software Development
Development of URS and software development of PLC, RIO and IPC according to the following IO Count			

[redacted]

Table 5: *Schedule of Quantities — Arithmetic Errors*

	Schedule No. and Description	Item No.	Description of error	Tendered Amount	Correct Amount
a	M26: Sludge Holding Tanks Equipment	NBA	Arithmetic error. The sum of the amounts stated for the items in this schedule is less than what the tenderer has offered.	R40 701 011.00	R38 335 392.00

The differential value of R2,365,619.00 (R40 701 011.0 minus R38 335 392.00) was not visible on the printed document because several rows were erroneously hidden during the printing process.

In this regard we refer you to the soft copy issued to the Employer and submitted as part of our tender submission, specifically line item M26-15 which although hidden contains the complete details of the items included under M26-15. The relevant descriptions and values, as per extract below are located between rows 54 and 66.

We thus confirm that the section total of R40 701 011.0 taking the additional items as detailed in M26-15 into account is in fact correct.

We apologize for the printing error and trust the above explanation clarifies the difference in value

52									
53	M26-15		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify)	Item	-				
54			**WAS Ring Main Pipework 1 - HDPE 400**	**Sum**	**1**	R	461 486.00	R	461 486.00
55			**WAS Ring Main Pipework 1 - HDPE**	**Sum**	**1**	R	139 943.00	R	139 943.00
56			**WAS Ring Main Pipework 2 - HDPE 400**	**Sum**	**1**	R	492 392.00	R	492 392.00
57			**WAS Ring Main Pipework 1 - HDPE**	**Sum**	**1**	R	143 233.00	R	143 233.00
58			**WAS Ring Main Pipework 1 - HDPE 200**	**Sum**	**1**	R	174 654.00	R	174 654.00
59			**WAS Ring Main Pipework 1 - HDPE**	**Sum**	**1**	R	122 612.00	R	122 612.00
60			**WAS Ring Main Pipework 1 - HDPE 200**	**Sum**	**1**	R	157 558.00	R	157 558.00
61			**WAS Ring Main Pipework 1 - HDPE**	**Sum**	**1**	R	122 612.00	R	122 612.00
62									
63			**Primary Sludge Ring Main Pipework -**	**Sum**	**1**	R	192 254.00	R	192 254.00
64			**Primary Sludge Ring Main Pipework -**	**Sum**	**1**	R	101 755.00	R	101 755.00
65			**Primary Sludge Ring Main Pipework -**	**Sum**	**1**	R	160 711.00	R	160 711.00
66			**Primary Sludge Ring Main Pipework -**	**Sum**	**1**	R	96 409.00	R	96 409.00
67									

b	E13: Instrumentation and Fieldbus Cables	E13-242	Tenderer changed item to "Rate Only". However, at tender the item was not stated as "Rate Only"	R31 374 004.00	R31 402 399.38

E13-242 Unit value is R202.82.

Cable Termination:

E13-242		1,5 mm² 8-pair o/all scr		No	140			202.824167	R 202.82	R	28 395.38

[redacted]

Considering the errors indicated in Table 5, the corrected value of the final tender sum, inclusive of 15% VAT, is now R 2 540 254 549.29. The BEC requires the tenderer to confirm whether they choose this correct amount (i.e., R 2 540 254 549.29) or the original tendered amount of R 2 543 143 941.99. Please tick the applicable box below:

- ☐ Yes, we choose the corrected amount.
- ✓ No, we choose the original tendered amount, and have provided rebalanced schedules for those listed in Table 5.

- Refer to Appendix A and B for the correct representations of schedules M26 and E13.

Yours faithfully,

[redacted]

[redacted]

City of Cape Town **11 February 2025**
Department: Bulk Services Wastewater

TENDER NO.: 191Q/2023/24
DESCRIPTION: DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS.

PREFERRED BIDDER NEGOTIATION.

Dear Sir,

We refer to the meeting held on 6 February 2025 where we were informed of our Preferred Bidder status on the above-mentioned project to negotiate final rates and possible savings on the contract.

Kindly refer attached for savings offered to items in the BOQ of our tender submission:

Yours faithfully,

[redacted]

[redacted]

Item	Tendered Sum	Negotiated Sum	Cost Saving
E9-2 Bioreactor HW	R9 569 830.81	R124 325.68	R9 445 505.13
E9-8 Bioreactor HW	R2 914 493.19	R175 154.27	R2 739 338.92
E9-14 Bioreactor	R1 153 171.09	R11 620.91	R1 141 550.18
E9-20 Bioreactor	R731 886.59	R53 268.41	R678 618.18
E9-1 PST HW	R3 045 462.62	R271 779.00	R2 773 683.62
E9.7 PST HW	R594 400.64	R73 403.31	R520 997.33
E9.13 PST	R354 431.54	R27 516.43	R326 915.11
E9.19 PST	R145 957.54	R16 830.80	R129 126.74
E9.6 SST HW	R3 877 099.10	R317 680.06	R3 559 419.04
E9.12 SST HW	R1 556 554.73	R72 075.17	R1 484 479.56
E9.18 SST	R475 219.45	R37 957.05	R437 262.40
E9.24 SST	R380 372.09	R19 496.97	R360 875.12
Total Savings using Sleeves & Import Racking			**R23 597 771.35**
M34-12 DIESEL	R49 374 765.00	R39 499 812.00	R9 874 953.00
Total Savings Diesel			**R9 874 953.00**
TOTAL SAVINGS			**R33 472 724.35**

PCI, INENZO and DEVCOTECH Consortium		
ALL RAND VALUES EXCL VAT		
ORIGINAL TENDER SUBMISSION:		
NET TOTAL OF WORKS		R 2,057,143,734.67
ADD 7.5% CONTINGENCIES		R 154,285,780.10
SUB-TOTAL		R 2,211,429,514.77
ADD 15% VAT		R 331,714,427.22
TENDER SUM INCLUSIVE OF VAT		R 2,543,143,941.99

SAVINGS OFFERED:		
DIESEL		R 9,874,953.00
CABLE RACKING		R 23,597,771.35
TOTAL SAVINGS		R 33,472,724.35

ORIGINAL TENDERED PRICE/ SUM:	A	R 2,057,143,734.67
NEGOTIATED PRICE/SUM	B	R 2,023,671,010.32
SAVINGS	C = (A – B)	R 33,472,724.35
SAVINGS (%)	(C/A X100)	1.63%

NEGOTIATED PRICE/SUM:		
NET TOTAL OF WORKS		R 2,023,671,010.32
ADD 7.5% CONTINGENCIES		R 151,775,325.77
SUB-TOTAL		R 2,175,446,336.10
ADD 15% VAT		R 326,316,950.41
TENDER SUM INCLUSIVE OF VAT		R 2,501,763,286.51

CITY OF CAPE TOWN

DIRECTORATE: WATER AND SANITATION

CONTRACT NO. 191Q/2023/24

DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS

C1.2 Contract Data

Data provided by the Contractor

The name of the Contractor is ……

The address of the Contractor is

Physical Address : …….. Postal Address : ……..

…….. ……..

…….. ……..

…….. ……..

…….. ……..

Telephone : …….. Fax: ……..

email : ……..

CONTRACTOR'S ANNUAL HOLIDAY PERIODS DURING CONSTRUCTION PERIOD

Year 1 contractor's annual holiday period	Start date	End date
Year 2 contractor's annual holiday period	Start date	End date
Year 3 contractor's annual holiday period	Start date	End date
Year 4 contractor's annual holiday period	Start date	End date
Year 5 contractor's annual holiday period	Start date	End date

CITY OF CAPE TOWN

DIRECTORATE: WATER AND SANITATION

CONTRACT NO. 191Q/2023/24

DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS

Bid specifications may not make any reference to any particular trade mark, name, patent, design, type, specific origin or producer, unless there is no other sufficiently precise or intelligible way of describing the characteristics of the work, in which case such reference must be accompanied by the words “or equivalent”.

TENDERERS MUST NOTE THAT WHEREVER THIS DOCUMENT REFERS TO ANY PARTICULAR TRADE MARK, NAME, PATENT, DESIGN, TYPE, SPECIFIC ORIGIN OR PRODUCER, SUCH REFERENCE SHALL BE DEEMED TO BE ACCOMPANIED BY THE WORDS ‘OR EQUIVALENT”.

C2.2 Schedule of Quantities

CONTENTS

C.2.2.1 Schedule of Quantities for Mechanical Portion of Works

SCHEDULE P&Gs GENERAL REQUIREMENTS AND CONDITIONS

SCHEDULE M1 ARCHIMEDEAN SCREW PUMPS

SCHEDULE M2 SCREENS, WATER LAUNDERS, WASHING SCREW PRESSES & SKIP DOLLY

SCHEDULE M3 GRIT REMOVAL EQUIPMENT

SCHEDULE M4 SLUICE GATES, HAND STOPS AND WEIRS

SCHEDULE M5 ODOUR CONTROL & COVERS

SCHEDULE M6 PRIMARY SETTLING TANKS

SCHEDULE M7 VERTICAL SHAFT MIXERS

SCHEDULE M8 FINE BUBBLE DIFFUSED AERATION

SCHEDULE M9 INTERNAL RECYCLE PUMPS

SCHEDULE M10 RETURN ACTIVATED SLUDGE PUMPS

SCHEDULE M11 SECONDARY SETTLING TANKS

SCHEDULE M12 ULTRAVIOLET DISINFECTION EQUIPMENT

SCHEDULE M13 CHLORINE BUILDING

SCHEDULE M14 CHEMICAL DOSING EQUIPMENT

SCHEDULE M15 COMPRESSED AIR SYSTEMS (INSTRUMENT AIR)

SCHEDULE M16 SCUM PUMP STATION

SCHEDULE M17 TSE PUMP STATION

SCHEDULE M18 SERVICE WATER SUPPLY SYSTEM

SCHEDULE M19 PRIMARY SLUDGE SCREENING EQUIPMENT

SCHEDULE M20 MAIN (MULTIPURPOSE) SLUDGE PUMPSTATION

SCHEDULE M21 GRAVITY THICKENERS

SCHEDULE M22 HYDROCYCLONES

SCHEDULE M23 BIOGAS HANDLING EQUIPMENT

SCHEDULE M24 SLUDGE HEATING EQUIPMENT

SCHEDULE M25 ANAEROBIC DIGESTER SLUDGE EQUIPMENT

SCHEDULE M26 SLUDGE HOLDING TANKS EQUIPMENT

SCHEDULE M27 SLUDGE DEWATERING EQUIPMENT

SCHEDULE M28 CAKE SILO LIVE BOTTOMS

SCHEDULE M29 POLYELECTROLYTE PREPARATION EQUIPMENT

SCHEDULE M30 COMBINED HEAT AND POWER (CHP) PLANT

SCHEDULE M31 LIFTING EQUIPMENT

SCHEDULE M32 VENTILATION SYSTEMS

SCHEDULE M33 SPARES

SCHEDULE M34 SUNDRIES

SCHEDULE M35 PROCESS CONTROL ASSISTANCE, MAINTENANCE AND TRAINING (FULL TIME)

SCHEDULE M36 MAINTENANCE INSPECTIONS (PART TIME)

SUMMARY

DECLARATION

C.2.2.2 Schedule of Quantities for Electrical Portion of Works

SCHEDULE E1 SUPPLY AND LOCAL AUTHORITY LIAISON

SCHEDULE E2 PRIMARY MV SWITCHGEAR

SCHEDULE E3 SECONDARY MV SWITCHGEAR

SCHEDULE E4 DISTRIBUTION TRANSFORMERS

SCHEDULE E5 ISOLATION TRANSFORMERS

SCHEDULE E6 MV CABLING

SCHEDULE E7 LV SWITCHGEAR, CONTROL ASSEMBLIES AND VFCs

SCHEDULE E8 LV CABLES

SCHEDULE E9 CABLE SUPPORT

SCHEDULE E10 AREA LIGHTING

SCHEDULE E11 EARTHING

SCHEDULE E12 DIESEL GENERATORS

SCHEDULE E13 INSTRUMENTATION AND FIELDBUS CABLES

SCHEDULE E14 MEASURING INSTRUMENTS

SCHEDULE E15 CONTROL & INSTRUMENTATION CABINETS AND JUNCTION BOXES

SCHEDULE E16 FIBRE OPTIC COMMUNICATION SYSTEMS

SCHEDULE E17 TELEMETRY EQUIPMENT

SCHEDULE E18 DATA ARCHITECTURE, SCADA, HISTORIAN AND REPORTING

SCHEDULE E19 PROGRAMMABLE LOGIC CONTROLLER (PLC)

SCHEDULE E20 MISCELLANEOUS AND SUNDRIES

SUMMARY

DECLARATION

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		BILL P&Gs **GENERAL REQUIREMENTS AND CONDITIONS** **Allow for all costs and expenses in connection with the following items for Phase 1:**				
P&Gs-1		Providing Performance Security	Sum	1	98222976.65	R 98,222,976.65
P&Gs-2		Providing Insurances	Sum	1	40269872.43	R 40,269,872.43
P&Gs-3		Detailed design of the Works and Submission of Contractor's Documents	Sum	1	16050950.53	R 16,050,950.53
P&Gs-4		Establishment of Contractor's camp, including security and ablution facilities	Sum	1	12240124.60	R 12,240,124.60
P&Gs-5		Destablishment of Contractor's camp, including security and ablution facilities	Sum	1	393058.00	R 393,058.00
P&Gs-6		Provision of water, electricity and other services	Sum	1	1071600.00	R 1,071,600.00
P&Gs-7		Provision of facilities for the Engineer, as described in the Scope of Work	Sum	1	550060.50	R 550,060.50
P&Gs-8		Project Management Services throughout contract duration	Sum	1	37561404.00	R 37,561,404.00
P&Gs-9		General expenses incurred in complying with the requirements of C1.2 Contract Data, not included above	Sum	1	15346205.00	R 15,346,205.00
		Health and Safety, Environmental and Quality Management for Phase 1:				
P&Gs-10		Compliance with the requirements of the Occupational Health and Safety Act 1993 and Construction Regulations 2014, including appointment of Construction Supervisor and Competent Person (for Health and Safety Plan see separate Item).	Sum	1	6789521.90	R 6,789,521.90
P&Gs-11		Provision of and adherence to a Health and Safety Plan	Sum	1	2951537.51	R 2,951,537.51
P&Gs-12		Compliance with the Health and Safety Specification in the Scope of Work	Sum	1	1949139.19	R 1,949,139.19
P&Gs-13		Liaison, co-ordination and chairing of meetings in respect of Health and Safety requirements.	Sum	1	83719.00	R 83,719.00
		Carried forward / ...				R 233,480,169.31

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 233,480,169.31
P&Gs-14		Quality management plan and quality assurance system	Sum	1	1916850.90	R 1,916,850.90
P&Gs-15		Compliance with the Environmental Management Specification in the Scope of Work	Sum	1	1220409.95	R 1,220,409.95
		Dealing with water for Phase 1::				
P&Gs-16		(a) Dealing with subsurface water	Sum	1	267438.00	R 267,438.00
P&Gs-17		(b) Dealing with surface water	Sum	1	247438.00	R 247,438.00
P&Gs-18		Other general expenses incurred in complying with the requirements of the Scope of Work not included above (Specify):	Item			
P&Gs-19		**Travel and accommodation time related**	**Sum**	**1**	7682755.00	R 7,682,755.00
P&Gs-20		**Construction Supervision Time related**	**Sum**	**1**	13431468.00	R 13,431,468.00
P&Gs-21		**Area Classification**	**Sum**	**1**	348750.00	R 348,750.00
P&Gs-22		**Site Handover & Final Commissioning**	**Sum**	**1**	602841.25	R 602,841.25
		Allow for all costs and expenses in connection with the following items for Phase 2:				
P&Gs-23		Providing Performance Security	Sum	1	792027.00	R 792,027.00
P&Gs-24		Providing Insurances	Sum	1	646250.00	R 646,250.00
P&Gs-25		Detailed design of the Works and Submission of Contractor's Documents	Sum	1	558366.00	R 558,366.00
P&Gs-26		Establishment of Contractor's camp, including security and ablution facilities	Sum	1	287828.00	R 287,828.00
P&Gs-27		Destablishment of Contractor's camp, including security and ablution facilities	Sum	1	17625.00	R 17,625.00
P&Gs-28		Provision of water, electricity and other services	Sum	1	8813.00	R 8,813.00
P&Gs-29		Provision of facilities for the Engineer, as described in the Scope of Work	Sum	1	0.00	R -
P&Gs-30		Project Management Services throughout contract duration	Sum	1	976099.00	R 976,099.00
P&Gs-31		General expenses incurred in complying with the requirements of C1.2 Contract Data, not included above	Sum	1	804875.00	R 804,875.00
		Carried forward / ...				R 263,290,003.41

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 263,290,003.41
		Health and Safety, Environmental and Quality Management for Phase 2:				
P&Gs-32		Compliance with the requirements of the Occupational Health and Safety Act 1993 and Construction Regulations 2014, including appointment of Construction Supervisor and Competent Person (for Health and Safety Plan see separate Item).	Sum	1	337813.00	R 337,813.00
P&Gs-33		Provision of and adherence to a Health and Safety Plan	Sum	1	8813.00	R 8,813.00
P&Gs-34		Compliance with the Health and Safety Specification in the Scope of Work	Sum	1	14688.00	R 14,688.00
P&Gs-35		Liaison, co-ordination and chairing of meetings in respect of Health and Safety requirements.	Sum	1	4407.00	R 4,407.00
P&Gs-36		Quality management plan and quality assurance system	Sum	1	41128.00	R 41,128.00
P&Gs-37		Compliance with the Environmental Management Specification in the Scope of Work	Sum	1	35250.00	R 35,250.00
		Dealing with water for Phase 2:				
P&Gs-38		(a) Dealing with subsurface water	Sum	1	8813.00	R 8,813.00
P&Gs-39		(b) Dealing with surface water	Sum	1	8813.00	R 8,813.00
P&Gs-40		Other general expenses incurred in complying with the requirements of the Scope of Work not included above (Specify):	Item			
P&Gs-41		**Travel and accommodation time related**	**Sum**	**1**	133386.00	R 133,386.00
P&Gs-42		**Construction Supervision Time related**	**Sum**	**1**	261438.00	R 261,438.00
		…….				
		…….				
TOTAL OF BILL P&Gs CARRIED TO SUMMARY						**R 264,144,552.41**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 17	**BILL M1** **ARCHIMEDEAN SCREW PUMPS** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:**				
M1-1		Screw pumps (all components included)	No	8	3561447.00	R 28,491,576.00
M1-2		Bottom Bearing Lubrication System	No	8		Included in M1-1
M1-3		GRP splash guards (Dome) including 316 stainless steel support brackets and anchors	Sum	1	1158250.00	R 1,158,250.00
		Allow for all costs and expenses in connection with the Site installation of the following:-				
M1-4		All materials and equipment for item 1 to 3 above. Includes grouting at lower bearing	Sum	1	1271820.00	R 1,271,820.00
		Other:-				
M1-5		Supervision of screeding trough area of each screw pump to ensure mechanical contractor's requirements are met without damage to equipment	No	8	33088.00	R 264,704.00
M1-6		All grease required for the lubrication of the lower bearings until the issue of the taking over certificate	Sum	1	2538.00	R 2,538.00
M1-7		Grease gun (and grease for the upper bearing until issuing of the taking over certificate)	Sum	1	1785.00	R 1,785.00
M1-8		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **…….** **…….** **…….**	Item		0.00	
TOTAL OF BILL M1 CARRIED TO SUMMARY						**R 31,190,673.00**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 18,19,20, 21, & 24	**BILL M2** **SCREENS & WASHING SCREW PRESSES** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:**				
M2-1		Mechanical front raked screens	No	4	1020158.00	R 4,080,632.00
M2-2		Perforated Plate Belt Screens	No	4	2033119.00	R 8,132,476.00
M2-3		40mm Hand raked screen at inlet works by-pass channel, including screenings collection trough and manual rake	No	2	123507.00	R 247,014.00
M2-4		25mm Hand raked screen at inlet works by-pass channel, including screenings collection trough and manual rake	No	2	177936.00	R 355,872.00
M2-5		Water launder	Sum	1	974697.00	R 974,697.00
M2-6		Wash presses including motorised diverter	No	4	867048.00	R 3,468,192.00
M2-7		Wash press drainage valve	No	4	18108.00	R 72,432.00
M2-8		Actuator for item 7 above	No	4	83756.00	R 335,024.00
M2-9		All pipework and valves at inlet works (including actuators)	Sum	1	1013856.00	R 1,013,856.00
M2-10		Skip Dolly suitable for two skips complete with gear motor and cable drum system (Inlet Works & Screen press)	No	3	251039.00	R 753,117.00
M2-11		Rail sets for skip dolly system (Inlet Works & Inline sludge Screen)	Sum	1	100354.00	R 100,354.00
		Allow for all costs and expenses in connection with the Site installation of the following:-				
M2-12		All materials and equipment summarized in Bill M2 complete	Sum	1	365002.00	R 365,002.00
		Other:-				
M2-13		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **…….** **…….** **…….**	Item	-		
TOTAL OF BILL M2 CARRIED TO SUMMARY						**R 19,898,668.00**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 22, 23 & 24	**BILL M3** **GRIT REMOVAL EQUIPMENT** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:**				
M3-1		Paddle system / vortex inducer complete with gearbox, motor and shaft	No	6	464727.00	R 2,788,362.00
M3-2		Grit fluidising pipework and valves (including any actuators)	Sum	1	842045.00	R 842,045.00
M3-3		Grit extraction pipework and valves (including actuators)	Sum	1	1321065.00	R 1,321,065.00
M3-4		Grit classifier complete (Inlet works).	No	3	1010726.00	R 3,032,178.00
M3-5		Grit classifier complete (WAS hydrocyclones).	No	1	1009776.00	R 1,009,776.00
M3-6		Drainage pipework from grit classifier including valves and supports (for item 4 and 5 above)	Sum	1	1302036.00	R 1,302,036.00
M3-7		Skip Dolly suitable for two skips complete with gear motor and cable drum system at inlet works	No	1	249140.00	R 249,140.00
M3-8		Rail sets for skip dolly system	Sum	1	46378.00	R 46,378.00
		Allow for all costs and expenses in connection with the Site installation of the following:-				
M3-9		All materials and equipment summarized in Bill M3 complete.	Sum	1	405328.00	R 405,328.00
		Other:-				
M3-10		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **…….** **…….** **…….** **…….** **…….**	Item	-		
TOTAL OF BILL M3 CARRIED TO SUMMARY						**R 10,996,308.00**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		BILL M4				
	Vol 3A, Section A 25 & 26	**SLUICE GATES, HAND STOPS AND WEIRS**				
		Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:				
		Channel Mounted Sluice Gates				
M4-1		Sluice gates upstream of 1st stage of screw pumps (11CH01 to 04)	No	4	166215.00	R 664,860.00
M4-2		Sluice gates upstream of 2nd stage of screw pumps (11CH05 to 08)	No	4	93458.00	R 373,832.00
M4-3		Sluice gates upstream of mechanical screens (12CH01 to 05)	No	5	110598.00	R 552,990.00
M4-4		Sluice gates downstream of perforated plated belt screens (13CH01 to 13CH05)	No	5	105383.00	R 526,915.00
M4-5		Sluice gates upstream of degritters (14CH01 to 14CH06, VLV01)	No	6	66620.00	R 399,720.00
M4-6		Upstream of UV screens (72CH02 to 72CH04, VLV01)	No	3	116388.00	R 349,164.00
M4-7		Downstream of the UV Banks (72UV01 to 72UV03 - VLV01)	No	3	149952.00	R 449,856.00
M4-8		Actuators for items 1 to 7 above	Sum	1	2366166.00	R 2,366,166.00
M4-9		Sluice gate for downstream of degritters (14CH01 to 14CH06, VLV02)	No	6	70861.00	R 425,166.00
M4-10		Sluice gate for upstream of PST splitter box (20CH01)	No	1	205900.00	R 205,900.00
M4-11		PST bypass channel Upstream of Bioreactor (20CH02)	No	1	204055.00	R 204,055.00
M4-12		Upstream of UV Channel (50CH07)	No	1	184479.00	R 184,479.00
M4-13		Maturation Pond 1 Isolation Gate (83DM03)	No	1	202867.00	R 202,867.00
M4-14		Maturation Pond 2 Isolation Gate (83DM04)	No	1	202867.00	R 202,867.00
M4-15		Maturation Pond 4 Isolation Gate (83DM05)	No	1	201692.00	R 201,692.00
M4-16		Maturation Pond 5 Isolation Gate (83DM02)	No	1	218738.00	R 218,738.00
M4-17		Downstream of UV screens (72CH02 to 72CH04 - VLV02)	No	3	127287.00	R 381,861.00
		Carried forward / ...				R 7,911,128.00

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 7,911,128.00
M4-18		Upstream of the UV Banks (72CH06 to 72CH08 - VLV01)	No	3	149111.00	R 447,333.00
M4-19		UV Bypass Channel Isolation Gates (72CH01 - VLV01 and VLV02)	No	2	182663.00	R 365,326.00
M4-20		Service Water pumpstation feed channel isolation gates	No	1	184030.00	R 184,030.00
M4-21		Bypass Effluent Maturation Pond 3 Isolation Gate	No	1	95615.00	R 95,615.00
M4-22		Bypass Effluent Maturation Pond 4 Isolation Gate	No	1	137063.00	R 137,063.00
M4-23		Bypass Effluent Maturation Pond 5 Isolation Gate	No	2	206926.00	R 413,852.00
M4-24		Bypass Effluent Maturation Pond 6 Isolation Gate	No	1	206926.00	R 206,926.00
		Wall Mounted Sluice Gates				
M4-25		Bypass Flow splitter Isolation Gates (16EB01-VLV01/02/03, 83DM06,83DM07,83DM08-VLV01)	No	6	161348.00	R 968,088.00
M4-26		PST Splitter Isolation Gates (21ST01,22ST01,23ST01,24ST01,25ST01,26ST01)	No	6	121027.00	R 726,162.00
M4-27		Reactor Splitter Isolation Gates (40RX01, 40RX02, 40RX03,40RX04,40RX05,40RX06)	No	6	119660.00	R 717,960.00
M4-28		Reactor Outlet Gates (41RX06,42RX06,43RX06,44RX06)	No	4	109499.00	R 437,996.00
M4-29		Actuators for item above	No	4	270793.00	R 1,083,172.00
M4-30		Gates Upstream Reactor on RAS return channel (41to44RX04 -VLV01 and 41to44RX05-VLV01)	No	8	106572.00	R 852,576.00
M4-31		Gates Upstream Anaerobic Zone (41to44RX07 -VLV01)	No	4	81228.00	R 324,912.00
M4-32		Gates Upstream Anoxic Zone (41to44RX08 - VLV01)	No	4	81228.00	R 324,912.00
M4-33		Reactor flow mixer (50CH07-VLV01 to VLV09)	No	9	130842.00	R 1,177,578.00
M4-34		SST Cluster 1 Splitter Isolation Gates 50CH02 - VLV01 to VLV06)	No	6	61720.00	R 370,320.00
		Carried forward / ...				R 16,744,949.00

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 16,744,949.00
M4-35		SST Cluster 2 Splitter Isolation Gates (50CH04 - VLV01 to VLV06)	No	6	64934.00	R 389,604.00
M4-36		Upstream of Chlorine Contact Tank (CH09 - VLV01 and VLV02)	No	2	90686.00	R 181,372.00
M4-37		Downstream to Chlorine Contact Tank	No	2	90686.00	R 181,372.00
M4-38		Isolation Gates between Service water pump station feed channel and service water pumpstation station	No	2	76055.00	R 152,110.00
M4-39		Isolation Gates between Treated effluent outlet channel and service water pumpstation station	No	4	76055.00	R 304,220.00
M4-40		Treated Effluent Outlet Channel isolation gates	No	1	218985.00	R 218,985.00
		Weir Plates				
M4-41		PST Splitter (21 to 26ST01-WEI01)	No	6	2545.00	R 15,270.00
M4-42		Upstream A recycle pump of all 4 reactors	No	12	2450.00	R 29,400.00
M4-43		Upstream R recycle pump of all 4 reactors	No	8	1539.00	R 12,312.00
M4-44		Upstream S recycle pump of all 4 reactors	No	8	1539.00	R 12,312.00
M4-45		SST Splitters	No	12	1274.00	R 15,288.00
M4-46		Reactor Flow Mixer	No	3	3171.00	R 9,513.00
		Hand stops				
M4-47		Provisional allowance for hand stops	Prov	1	2 000 000	R 2,000,000.00
M4-48		Charge required by Contractor on above item	%	2 000 000		R 320,000.00
		Allow for all costs and expenses in connection with the Site installation of the following:-				
M4-49		All materials and equipment summarized in Bill M4 complete including grouting.	Sum	1	2831092.00	R 2,831,092.00
		Other:-				
M4-50		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **…….** **…….** **…….**	Item	-		
TOTAL OF BILL M4 CARRIED TO SUMMARY						**R 23,417,799.00**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		BILL M5				
	Vol 3A, Section A 27 & 63	**ODOUR CONTROL & COVERS**				
		Odour Control (Located at Inlet Works):				
M5-1		Odour control study	Sum	1	298567.00	R 298,567.00
M5-2		Inspection reports (as specified)	Sum	1	7500.00	R 7,500.00
		Odour Control (Located at Main sludge pump station/Gravity thickener):				
M5-3		Odour control study	Sum	1	298567.00	R 298,567.00
M5-4		Inspection reports (as specified)	Sum	1	7800.00	R 7,800.00
		Odour Control (Located at Dewatering Building):				
M5-5		Odour control study	Sum	1	298567.00	R 298,567.00
M5-6		Inspection reports (as specified)	Sum	1	7800.00	R 7,800.00
		Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:				
		Odour Control (Located at Inlet Works):				
M5-7		Channel and equipment covers (Including PST Launders)	m^2	1 850	975.00	R 1,803,750.00
M5-8		All odour extraction piping, supports and valves	Sum	1	1803466.00	R 1,803,466.00
M5-9		Concrete slab with reinforcement for odour control equipment	m3	30	4375.00	R 131,250.00
M5-10		Brickwork and concrete slab for extraction pipe manifold and drain points chamber	Sum	1	15750.00	R 15,750.00
M5-11		Biological trickling filter odour control system including media (complete)	Sum	1	7466376.00	R 7,466,376.00
M5-12		Media / chemicals as required	Sum	1		
M5-13		Extraction fans (incl. motor and supports)	Sum	1	349080.00	R 349,080.00
M5-14		Nutrient supply for one year continuous operation (if required)	Sum	1	264639.00	R 264,639.00
		Carried forward / ...				R 12,753,112.00

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 12,753,112.00
		Odour Control (Located at Main sludge pump station/Gravity thickener):				
M5-15		Channel and equipment covers	m^2	300	1014.00	R 304,200.00
M5-16		All odour extraction piping, supports and valves	Sum	1	909817.00	R 909,817.00
M5-17		Concrete slab with reinforcement for odour control equipment	m^3	30	4550.00	R 136,500.00
M5-18		Brickwork and concrete slab for extraction pipe manifold and drain points chamber	Sum	1	81900.00	R 81,900.00
M5-19		Biological trickling filter odour control system including media (complete)	Sum	1	3968811.00	R 3,968,811.00
M5-20		Media / chemicals as required	Sum	1		
M5-21		Extraction fans (incl. motor and supports)	Sum	1	242035.00	R 242,035.00
M5-22		Nutrient supply for one year continuous operation (if required)	Sum	1	49399.00	R 49,399.00
		Odour Control (Located at Dewatering Building):	Sum			
M5-23		Channel and equipment covers	m^2	100	1014.00	R 101,400.00
M5-24		All odour extraction piping, supports and valves	Sum	1	1049143.00	R 1,049,143.00
M5-25		Concrete slab with reinforcement for odour control equipment	m^3	60	4550.00	R 273,000.00
M5-26		Brickwork and concrete slab for extraction pipe manifold and drain points chamber	Sum	1	8190.00	R 8,190.00
M5-27		Modular biological filter, biotrickling filter or hybrid biotrickling filter/biological filter including media (if applicable)	Sum	1	4504911.00	R 4,504,911.00
M5-28		Media / chemicals as required	Sum	1		
M5-29		Extraction fans (incl. motor and supports)	Sum	1	294214.00	R 294,214.00
M5-30		Nutrient supply for one-year continuous operation (if required)	Sum	1	70570.00	R 70,570.00
		Allow for all costs and expenses in connection with the Site installation of the following:-	Sum			
		Carried forward / ...				R 24,747,202.00

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 24,747,202.00
M5-31		All items listed in Bill M5, Items 7 to 14. Includes excavating, laying, bedding and backfilling of all odour control pipes.	Sum	1	42136.00	R 42,136.00
M5-32		All items listed in Bill M5, Items 15 to 22. Includes excavating, laying, bedding and backfilling of all odour control pipes.	Sum	1	20439.00	R 20,439.00
M5-33		All items listed in Bill M5, Items 23 to 30. Includes excavating, laying, bedding and backfilling of all odour control pipes.	Sum	1	23569.00	R 23,569.00
		Other:				
M5-34		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **……** **……** **……** **……** **……**	Item	1	327319.55	R 327,319.55
TOTAL OF BILL M5 CARRIED TO SUMMARY						**R 25,160,665.55**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 28	**BILL M6** **PRIMARY SETTLING TANKS** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:**				
M6-1		Clarifier bridge and supports complete with centre bearing, guard rails, access ladder, bottom scrapers and drive etc.	No	4	3044688.49	R 12,178,753.96
M6-2		Spray bar system (including pumps, pipework, valves and supports)	Sum	1		INCL
M6-3		V-notch weirs	No	4		INCL
M6-4		Central inlet pipe and stilling well	No	4		INCL
M6-5		Desludge valves complete with actuator	No	4	123883.28	R 495,533.12
M6-6		Total solids analyser (on sludge cake discharge pipes)	No.	2	507213.30	R 1,014,426.60
		Allow for all costs and expenses in connection with the Site installation of the following:-				
M6-7		Materials and equipment summarized in Bill M6 for items 1 to 5 **Other:-**	Sum	1	796400.00	R 796,400.00
M6-8		Supervision of screeding each clarifier to ensure mechanical contractor's requirements are met without damage to equipment	Sum	1	74800.00	R 74,800.00
M6-9		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **Screeding of PST as per spec - 32mm floor diameter** **……..** **……..** **……..** **……..**	Item	4	211200.00	R 844,800.00
TOTAL OF BILL M6 CARRIED TO SUMMARY						**R 15,404,713.68**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 29	**BILL M7** **VERTICAL SHAFT MIXERS**				
M7-1		CFD analysis of mixers in anaerobic basin	Sum	1	63195.00	R 63,195.00
M7-2		CFD analysis of mixers in anoxic basin	Sum	1	63195.00	R 63,195.00
M7-3		CFD analysis of mixers in balancing/emergency tank	Sum	1	63195.00	R 63,195.00
M7-4		CFD analysis of mixers in Main Sludge Pump Station	Sum	1	63195.00	R 63,195.00
		Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:				
M7-5		Mixers for Anaerobic Zone 01 Reactor 01,02, 03, 04 (incl. motor and gearbox)	No	12	246501.75	R 2,958,021.00
M7-6		Mixers for Anoxic Zone 01 & 02 Reactor 01,02,03,04 (incl. motor and gearbox)	No	24	304042.75	R 7,297,026.00
M7-7		Mixers for balancing/emergency tank (incl. motor and gearbox)	No	23	238139.84	R 5,477,216.32
		Mixers for Main Sludge Pump Station sump (incl. motor and gearbox)				
M7-8		a. WAS Sump	No	2	89454.75	R 178,909.50
M7-9		b. Primary sludge sump	No	1	92754.75	R 92,754.75
M7-10		c. Thickened Sludge	No	2	89454.75	R 178,909.50
		Allow for all costs and expenses in connection with the Site installation of the following:-				
M7-11		All materials and equipment summarized in Bill M7 for items 5 to item 10 above	Sum	1	396000.00	R 396,000.00
		Other:				
M7-12		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **Commissioning of mixers** **……..**	Item	1	105600.00	R 105,600.00
TOTAL OF BILL M7 CARRIED TO SUMMARY						**R 16,937,217.07**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 31	**BILL M8** **FINE BUBBLE DIFFUSED AERATION** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:**				
M8-1		Blowers complete with motors, integrated control cabinet and user interface, filters, all silencers, sound attenuating hoods etc.	No	8	6755755.76	R 54,046,046.08
M8-2		Stainless steel manifolds and connecting pipework to each blower inside blower room complete with isolation valves, non-return valves and supports for centrifugal type blower package	Sum	1		INCL
M8-3		Stainless steel blowline from blower room to reactor walkway including connections to manifold at blower room. Couplings and supports to be included	Sum	1	17900174.16	R 17,900,174.16
M8-4		Stainless steel elevated blowline at reactor walkway including couplings, elbows and supports	Sum	1		INCL
M8-5		Drop legs from blowline to reactor floor including supports and lateral s/s piping	Sum	1		INCL
M8-6		V-Port knife gate valve including electric actuator for V-Port knife gate valve modulation	No	24	149016.27	R 3,576,390.48
M8-7		Manual isolation knife gate valve (upstream of each V-Port knife gate valve)	No	24	35519.74	R 852,473.76
M8-8		Lateral and distribution pipework including anchors, supports and condensate removal system for both basins	Sum	1	4240682.60	R 4,240,682.60
M8-9		Diffusers and membranes	Sum	1	5798540.00	R 5,798,540.00
		Allow for all costs and expenses in connection with the Site installation of the following:-				
M8-10		Blowers complete with motors, integrated control cabinet and user interface, filters, all silencers, sound attenuating hoods etc.	No	8	48675.00	R 389,400.00
		Carried forward / ...				R 86,803,707.08

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 86,803,707.08
M8-11		Stainless steel manifolds and connecting pipework to each blower inside blower room complete with isolation valves, non-return valves and supports for centrifugal type blower package	Sum	1	796400.00	R 796,400.00
M8-12		Stainless steel blowline from blower room to reactor walkway including connections to manifold at blower room. Couplings and supports to be included	Sum	1		INCL
M8-13		Stainless steel elevated blowline at reactor walkway including couplings, elbows and supports	Sum	1		INCL
M8-14		Drop legs from blowline to reactor floor including supports and lateral s/s piping	Sum	1		INCL
M8-15		All materials and equipment summarized in Bill M8 for items 6 & 7	Sum	1		INCL
M8-16		Lateral and distribution pipework including anchors, supports and condensate removal system for all basins	Sum	1	910800.00	R 910,800.00
M8-17		Diffusers and membranes	Sum	1	88000.00	R 88,000.00
		Other:				
M8-18		Testing of FBDA system	Sum	1	98984.60	R 98,984.60
M8-19		Performance testing of entire FBDA system using the steady state method.	Sum	1	154000.00	R 154,000.00
M8-20		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify)	Item	1	550000.00	R 550,000.00
		BARS control - most open valve algorithm				
		.....				
		.....				
		.....				
TOTAL OF BILL M8 CARRIED TO SUMMARY						**R 89,401,891.68**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 30	**BILL M9** **INTERNAL RECYCLE PUMPS** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:**				
M9-1		A-Recycle: Axial Flow Recycle Pump (incl. motor) complete	No	12	388939.11	R 4,667,269.32
M9-2		R-Recycle: Axial Flow Recycle Pump (incl. motor) complete	No	8	263555.48	R 2,108,443.84
		Allow for all costs and expenses in connection with the Site installation of the following:-				
M9-3		All materials and equipment summarized for item 1 above	Sum	1	130900.00	R 130,900.00
M9-4		All materials and equipment summarized for item 2 above	Sum	1	112200.00	R 112,200.00
		Other:-				
M9-5		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **……** **……** **……** **……** **……**	Item	-		
TOTAL OF BILL M9 CARRIED TO SUMMARY						**R 7,018,813.16**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 35	**BILL M10** **RETURN ACTIVATED SLUDGE PUMPS** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:**				
M10-1		Vertical axial pump (submersible)	No	8	591199.27	R 4,729,594.16
M10-2		Coupling ring with flange for concrete well	No	8	43547.90	R 348,383.20
		Allow for all costs and expenses in connection with the Site installation of the following:-				
M10-3		All materials and equipment list in Bill M10 complete	Sum	1	168300.00	R 168,300.00
		Other:-				
M10-4		Witness test including test certificates	No	8	26180.00	R 209,440.00
M10-5		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **……** **……** **……** **……** **……**	Item	-		
TOTAL OF BILL M10 CARRIED TO SUMMARY						**R 5,455,717.36**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 33	**BILL M11** **SECONDARY SETTLING TANKS** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:**				
M11-1		Clarifier bridge and supports complete with centre bearing, guard rails, access ladder, bottom scrapers and drive etc.	No	12	3122850.38	R 37,474,204.56
M11-2		V-notch weirs	No	12		INCL
M11-3		Scum removal system (includes scum box, scum scraper, baffle plate, etc)	Sum	1		INCL
M11-4		Central inlet pipe and stilling well	No	12		INCL
M11-5		Telescopic valves complete with actuator	No	12	238297.22	R 2,859,566.64
		Allow for all costs and expenses in connection with the Site installation of the following:-				
M11-6		Materials and equipment summarized in Bill M11 for items 1 to 5	Sum	1	2389200.00	R 2,389,200.00
		Other:-				
M11-7		Supervision of screeding each clarifier to ensure mechanical contractor's requirements are met without damage to equipment	Sum	1	224400.00	R 224,400.00
M11-8		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **Screeding of SST as per spec - 35m floor diameter** **……..** **……..** **……..** **……..**	Item	12	246400.00	R 2,956,800.00
TOTAL OF BILL M11 CARRIED TO SUMMARY						**R 45,904,171.20**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 37	**BILL M12** **ULTRAVIOLET DISINFECTION EQUIPMENT** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:**				
M12-1		Mechanical Screens	No	3	1066466.34	R 3,199,399.02
M12-2		Screw Conveyor	No	1	563824.90	R 563,824.90
M12-3		Wheelie Bin 240L	No	1	9282.80	R 9,282.80
M12-4		UV dosing equipment complete	Sum	1	34984277.08	R 34,984,277.08
M12-5		Channel covers.	Sum	1	295388.00	R 295,388.00
		Allow for all costs and expenses in connection with the Site installation of the following:-				
M12-6		All materials and equipment summarized in Bill M12 complete (items 1 to 5).	Sum	1	96600.00	R 96,600.00
		Other:-				
M12-7		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify)	Item	1		
		UV FAT Witness Testing by client as specified **……..** **……..** **……..** **……..**	**Item**	**1**	100000.00	R 100,000.00
TOTAL OF BILL M12 CARRIED TO SUMMARY						**R 39,248,771.80**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 38 & 39	**BILL M13** **CHLORINE BUILDING** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:** **High Pressure Room Chlorine Dosing Equipment:**				
M13-1		Auto Changeover Devices	No	2	90479.00	R 180,958.00
M13-2		Drum Cradles with Scales (mass meters)	No	6	70459.00	R 422,754.00
M13-3		Drum Cradles without Scales	No	6	14958.00	R 89,748.00
M13-4		All chlorine gas pipework complete as specified, including valves, pressure reducing devices, catchpots, heaters, vaporisers, pigtails supports etc., as required	Sum	1	439160.00	R 439,160.00
M13-5		Vacuum Regulator	No	2	173221.00	R 346,442.00
		Low Pressure Room Chlorine Dosing Equipment:				
M13-6		Chlorinators	No	2	281839.00	R 563,678.00
M13-7		Injectors	No	2	110744.00	R 221,488.00
M13-8		Motive Water Pumps (complete with motor, couplings, etc.)	No	2	197547.00	R 395,094.00
M13-9		Motive water pipework, pipe supports, filters, valves, etc.)	Sum	1	145882.00	R 145,882.00
M13-10		Chlorine sparge bars (located at the chlorine contact tank disinfection chamber)	Sum	1	9365.00	R 9,365.00
M13-11		Residual chlorine meters	Sum	1	157177.00	R 157,177.00
		Chlorine Dosing Safety Equipment:				
M13-12		Gas Leak Detector, including beacon and siren	No	1	105904.00	R 105,904.00
M13-13		Breathing Apparatus set including enclosure	No	2	35197.00	R 70,394.00
		Carried forward / ...				R 3,148,044.00

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 3,148,044.00
M13-14		Windsock	No	1	15923.00	R 15,923.00
M13-15		Emergency Closure Kit (safety equipment including weather proof cabinet, gas masks, eye wash bottle, etc.)	No	1	590578.00	R 590,578.00
M13-16		Ventilation System	Sum	1	98007.00	R 98,007.00
M13-17		Safety Signage (wall charts)	Sum	1	5734.00	R 5,734.00
M13-18		**Two** complete Stainless Steel full body shower and eye bath (including Accumulator and Pumps)	Sum	1	49621.00	R 49,621.00
		Chlorine Scrubber:				
M13-19		Dry Chlorine Scrubber (complete with extraction fan(s)) as specified	Sum	1	2897499.00	R 2,897,499.00
		Allow for all costs and expenses in connection with the Site installation of the following:-				
		High Pressure Room Chlorine Dosing Equipment				
M13-20		Auto Changeover Device	No	2	2256.00	R 4,512.00
M13-21		Drum Cradles with Scales (mass meters)	No	6	127.00	R 762.00
M13-22		Drum Cradles without Scales	No	6	127.00	R 762.00
M13-23		All chlorine gas pipework complete as specified, including valves, pressure reducing devices, catchpots, heaters, vaporisers, pigtails supports etc., as required	Sum	1	36820.00	R 36,820.00
M13-24		Vacuum Regulator	No	2	861.00	R 1,722.00
		Low Pressure Room Chlorine Dosing Equipment:				
M13-25		Chlorinator Skids Complete	No	2	606.00	R 1,212.00
M13-26		Injectors	No	2	559.00	R 1,118.00
M13-27		Motive Water Pumps	No	3	497.00	R 1,491.00
		Carried forward / ...				R 6,853,805.00

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 6,853,805.00
M13-28		Motive water pipework, with pipe supports, valves, etc.	Sum	1	2327.00	R 2,327.00
M13-29		Chlorine sparge bars (located at the chlorine contact tank disinfection chamber)	Sum	1	2644.00	R 2,644.00
		Chlorine Dosing Safety Equipment:				
M13-30		Gas Leak Detector, including beacon and siren	No	1	4559.00	R 4,559.00
M13-31		Breathing Apparatus set including enclosure	No	2	1322.00	R 2,644.00
M13-32		Windsock	No	1	2644.00	R 2,644.00
M13-33		Emergency Closure Kit (safety equipment including weather proof cabinet, gas masks, eye wash bottle, etc.)	No	1	2738.00	R 2,738.00
M13-34		Ventilation System	Sum	1	5582.00	R 5,582.00
M13-35		Safety Signage (wall charts)	Sum	1	2327.00	R 2,327.00
M13-36		Two complete Stainless Steel full body shower and eye bath (including Accumulator and Pumps)	Sum	1	8930.00	R 8,930.00
M13-37		Residual chlorine meters	Sum	1	9024.00	R 9,024.00
		Chlorine Scrubber				
M13-38		Dry Chlorine Scrubber as specified	Sum	1	24910.00	R 24,910.00
		Other:				
M13-39		Provisional allowance for MHI study for chlorine installation	Prov	1	1 000 000	R 1,000,000.00
M13-40		Charge required by Contractor for above item	%	1 000 000		R 160,000.00
		Other				
M13-41		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant *(Specify)* **.....** **.....** **.....**	Item			
TOTAL OF BILL M13 CARRIED TO SUMMARY						**R 8,082,134.00**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 32	**BILL M14** **CHEMICAL DOSING EQUIPMENT** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:** **Coagulant for P-removal Equipment**				
M14-1		Chemical room ventilation system	~~Sum~~	~~1~~		
M14-2		Dosing system (bunded skids and cabinet etc) as specified	Sum	1	1723399.00	R 1,723,399.00
M14-3		Pressurised storage tanks	No	2	1445207.00	R 2,890,414.00
M14-4		Pipework	Sum	1	546968.00	R 546,968.00
M14-5		Filling station booster pump (inclusive of bunded skids and cabinet etc)	Sum	1	216997.00	R 216,997.00
M14-6		Supports	Sum	1	16039.00	R 16,039.00
M14-7		FRP banded grating and frame support	m^2	60	3569.00	R 214,140.00
M14-8		Grating support beams (50 x 150 x 5mm)	Sum	1	845635.00	R 845,635.00
M14-9		Chemical required during the entire performance period (commissioning) of the plant	Sum	1	5513674.00	R 5,513,674.00
M14-10		Chemical - one tank fill	No	2	196917.00	R 393,834.00
		Formic Acid Dosing Skid				
M14-11		Formic Acid mobile dosing skid system	Sum	1	38598.00	R 38,598.00
M14-12		Formic Acid for commissioning (at least 50L)	Sum	1	2574.00	R 2,574.00
M14-13		Formic Acid Skid - one tank fill	Sum	1	2574.00	R 2,574.00
		Allow for all costs and expenses in connection with the Site installation of the following:- **Coagulant for P-removal Equipment**				
M14-14		Chemical room ventilation system	~~Sum~~	~~1~~		
		Carried forward / ...				R 12,404,846.00

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 12,404,846.00
M14-15		Dosing system (bunded skids and cabinet etc) as specified	Sum	1	26884.00	R 26,884.00
M14-16		Pressurised storage tanks	No	2	5676.00	R 11,352.00
M14-17		Pipework	Sum	1	5676.00	R 5,676.00
M14-18		Filling station booster pump (inclusive of bunded skids and cabinet etc)	Sum	1	5676.00	R 5,676.00
M14-19		Supports	Sum	1	5676.00	R 5,676.00
M14-20		FRP banded grating and frame support	m^2	60	345.00	R 20,700.00
M14-21		Grating support beams (50 x 150 x 5mm) as shown on drawings	Sum	1	41360.00	R 41,360.00
M14-22		Chemical required during the entire performance period (commissioning) of the plant	Sum	1	8272.00	R 8,272.00
		Formic Acid Dosing Skid				
M14-23		Formic Acid for commissioning (at least 50L)	Sum	1	7144.00	R 7,144.00
M14-24		Formic Acid Skid - one tank fill	Sum	1	8272.00	R 8,272.00
		Allow for all costs and expenses in connection with Chemical Dosing Safety Equipment for the following:				
		Coagulant for P-removal Equipment				
M14-25		Supply of full set of Chemical Handling PPE (including Goggles, Aprons, Respirators, Masks, Aprons/Body Suits etc.) as required by chemical.	No	12	19781.00	R 237,372.00
M14-26		Windsock	No	1	4302.00	R 4,302.00
M14-27		Safety equipment including weather proof cabinet, gas masks, eye wash bottle, etc.)	No	2	18814.00	R 37,628.00
M14-28		Safety Signage (wall charts)	Sum	1	16850.00	R 16,850.00
		Carried forward / ...				R 12,842,010.00

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 12,842,010.00
M14-29		Complete Shower Stainless Steel full body shower and eye bath (including Accumulator and Pumps)	No	1	31725.00	R 31,725.00
M14-30		Provisional allowance for chemical dosing building ventilation system (to include installation, testing and commissioning)	Prov	1	300 000	R 300,000.00
M14-31		Charge required by Contractor for above item.	%	300 000		R 48,000.00
M14-32		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant *(Specify)* **.....** **.....** **.....**	Item			
TOTAL OF BILL M14 CARRIED TO SUMMARY						**R 13,221,735.00**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 43	**BILL M15** **COMPRESSED AIR SYSTEMS (INSTRUMENT AIR)** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:** **Chlorine Dosing Building:**				
M15-1		Compressors (complete with accoustic enclosure, inlet filter, after cooler, oil separator, etc.)	No	2	146074.00	R 292,148.00
M15-2		Condensate / moisture trap	No	2	15522.00	R 31,044.00
M15-3		Air receiver	No	2	146283.00	R 292,566.00
M15-4		Condensate management system	Sum	1	57647.00	R 57,647.00
M15-5		Air pipework (including drain pipes, pipe supports, valves, etc.).	Sum	1	307735.00	R 307,735.00
M15-6		Seperator units and filter sets	No	2	14929.00	R 29,858.00
M15-7		Pneumatic actuated valves (inside chlorine building)	Sum	1		Included in M13-4
		Dewatering Building:				
M15-8		Compressors (complete with acoustic enclosure, inlet filter, after cooler, oil separator, etc.)	No	2	146074.00	R 292,148.00
M15-9		Condensate / moisture trap	No	2	15522.00	R 31,044.00
M15-10		Air receiver	No	2	146283.00	R 292,566.00
M15-11		Condensate management system	Sum	1	57647.00	R 57,647.00
M15-12		Air pipework (including drain pipes, pipe supports, valves, etc.).	Sum	1	192928.00	R 192,928.00
M15-13		Separator units and filter sets	No	2	14929.00	R 29,858.00
M15-14		Silo pneumatic actuated equipment	Sum	1	251603.00	R 251,603.00
		Carried forward / ...				R 2,158,792.00

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 2,158,792.00
		Allow for all costs and expenses in connection with the Site installation of the following:-				
M15-15		Chlorine Building Compressed Air System - complete	Sum	1	124080.00	R 124,080.00
M15-16		Dewatering Building Compressed Air System - complete	Sum	1	248160.00	R 248,160.00
		Other:				
M15-17		**All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant** ***(Specify)***				
TOTAL OF BILL M15 CARRIED TO SUMMARY						**R 2,531,032.00**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 42	**BILL M16** **RETURN FLOW PUMP STATION** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:**				
M16-1		Submersible Centrifugal Pumps (complete with duckfoot connection, guide rails, electrical cable, lifting chains, etc.).	No	2	214746.57	R 429,493.14
M16-2		Discharge Pipework (including puddle pipes, couplings, supports, etc.)	Sum	1	416282.57	R 416,282.57
M16-3		All isolation valves, non-return valves, instrumentation and pressure gauges, etc.	Sum	1	289487.00	R 289,487.00
		Allow for all costs and expenses in connection with the Site installation of the following:-				
M16-4		All materials and equipment summarized in Bill M16 complete (items 1 to 3).	Sum	1	49500.00	R 49,500.00
		Other:-				
M16-5		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **……..** **……..** **……..** **……..** **……..**	Item	-		
TOTAL OF BILL M16 CARRIED TO SUMMARY						**R 1,184,762.71**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 40	**BILL M17** **TSE PUMP STATION** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:**				
M17-1		Multi-stage centrifugal pumps (complete with baseplates, couplings, coupling guards, etc.) for Macassar network	No	5	1747862.00	R 8,739,310.00
M17-2		Multi-stage centrifugal pumps (complete with baseplates, couplings, coupling guards, etc.) for Zandvliet network	No	2	1744443.00	R 3,488,886.00
M17-3		All suction and discharge pipework (including puddle pipes, flange adapters, pipe supports etc.) inside the TSE Pump Station for pumps in 17-1 and 17-2 above.	Sum	1	3272342.00	R 3,272,342.00
M17-4		All isolation valves, check valves, control valves, instrumentation, pressure gauges, etc. for pumps in 17-1 and 17-2 above.	Sum	1	2138043.00	R 2,138,043.00
M17-5		Primary and secondary automatic self-cleaning filters (for the Macassar TSE Network)	Sum	1	4743240.00	R 4,743,240.00
M17-6		Primary and secondary automatic self-cleaning filters (for the Zandvliet TSE Network)	Sum	1	1849803.00	R 1,849,803.00
M17-7		Macassar TSE Network filter pipework, couplings, pipe supports, gauges and valves, etc.	Sum	1	3084334.00	R 3,084,334.00
M17-8		Zandvliet TSE Network filter pipework, couplings, pipe supports, gauges and valves, etc.	Sum	1	1518616.00	R 1,518,616.00
		Allow for all costs and expenses in connection with the Site installation of the following:-				
M17-9		All materials and equipment summarized in Bill M17 complete (items 1 to 8).	Sum	1	411532.00	R 411,532.00
		Other:-				
M17-10		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify)	Item	-		
		Ring main connection 1 - DN450 HDPE	Sum	1	478701.00	R 478,701.00
		HDPE 450 Pipework - Installation	Sum	1	118440.00	R 118,440.00
		Ring main connection 2 - DN250 HDPE	Sum	1	229685.00	R 229,685.00
		HDPE 250 Pipework - Installation	Sum	1	106690.00	R 106,690.00
		Surge Analysis on recirculation Lines	Sum	1	58750.00	R 58,750.00
		……..				
TOTAL OF BILL M17 CARRIED TO SUMMARY						**R 30,238,372.00**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 41	**BILL M18** **SERVICE WATER SUPPLY SYSTEM** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:**				
M18-1		End suction centrifugal pumps (complete with baseplates, couplings, coupling guards, etc.)	No	5	507915.00	R 2,539,575.00
M18-2		Pipework (including puddle pipes, flange adapters, pipe supports, etc.).	Sum	1	2460207.00	R 2,460,207.00
M18-3		All isolation valves, control valves, instrumentation, pressure gauges, etc.	Sum	1	1023468.00	R 1,023,468.00
M18-4		Automatic self-cleaning filters	No	3	633991.00	R 1,901,973.00
M18-5		Basket Strainer (Manual strainer)	No	2	320583.00	R 641,166.00
M18-6		Service water supply pipework connection lines to end users (includes all Service water piping terminating at the respective equipment). **Allow for all costs and expenses in connection with the Site installation of the following:-**	Sum	1	6729944.00	R 6,729,944.00
M18-7		Materials and equipment summarized in Bill M18; Items 1 to 5	Sum	1	213004.00	R 213,004.00
M18-8		Service water supply pipework connection lines to end users (includes all Service water piping terminating at the respective equipment). **Other:-**	Sum	1	496320.00	R 496,320.00
M18-9		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify)	Item	-		
		Ring main connection 1 - DN300 HDPE	**Sum**	**1**	126564.00	R 126,564.00
		HDPE 300 Pipework - Installation	**Sum**	**1**	59925.00	R 59,925.00
		……..				
		……..				
TOTAL OF BILL M18 CARRIED TO SUMMARY						**R 16,192,146.00**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 44 & 45	**BILL M19** **PRIMARY SLUDGE SCREENING EQUIPMENT** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:**				
M19-1		End suction, non-clog type, centrifugal pumps (complete with motor, baseplate, couplings, etc.)	No	2	330801.00	R 661,602.00
M19-2		Pipework (including puddle pipes, flange adapter, couplings, pipe supports, valves, etc.) for Item 1 above	Sum	1	509360.00	R 509,360.00
M19-3		Check valve, isolation valves, control valves, pressure gauges, instrumentation, etc. for Item 1 above	Sum	1	438052.00	R 438,052.00
M19-4		Primary Sludge Inline Screens (complete with motor, gearbox, instrumentation, local control panel).	No	3	1823878.00	R 5,471,634.00
M19-5		Pipework, isolation valves, control valves, etc. for Item 4 above	Sum	1	775849.00	R 775,849.00
M19-6		Custom screenings discharge chutes for Item 4	Sum	1	236488.00	R 236,488.00
M19-7		Elevated steel platform with access walkway for item 4 above	Sum	1	1664129.00	R 1,664,129.00
		Allow for all costs and expenses in connection with the Site installation of the following:-				
M19-8		All materials and equipment summarized in Bill M19 complete (Items 1 to 7).	Sum	1	250228.00	R 250,228.00
		Other:-				
M19-9		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **……..** **……..**	Item	-		
TOTAL OF BILL M19 CARRIED TO SUMMARY						**R 10,007,342.00**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 46	**BILL M20** **MAIN (MULTIPURPOSE) SLUDGE PUMPSTATION** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:**				
M20-1		WAS transfer pumps (complete with motors, gearboxes, couplings, etc.)	No	3	711122.50	R 2,133,367.50
M20-2		Digester feed pumps (complete with motors, gearboxes, couplings, etc.)	No	2	455552.90	R 911,105.80
M20-3		Thickener feed pumps (complete with motors, gearboxes, couplings, etc.)	No	2	709074.30	R 1,418,148.60
M20-4		Pipework for item 1 including puddle pipes, couplings, supports, gauges and pipework to drain.	Sum	1	667133.00	R 667,133.00
M20-5		Pipework for item 2 including puddle pipes, couplings, supports, gauges and pipework to drain.	Sum	1	451299.38	R 451,299.38
M20-6		Pipework for item 3 including puddle pipes, couplings, supports, gauges and pipework to drain.	Sum	1	627859.92	R 627,859.92
M20-7		All drain, pressure relief, isolation and control valves etc. for item 1 above.	Sum	1	542158.10	R 542,158.10
M20-8		All drain, pressure relief, isolation and control valves etc. for item 2 above.	Sum	1	214071.00	R 214,071.00
M20-9		All drain, pressure relief, isolation and control valves etc. for item 3 above.	Sum	1	457820.00	R 457,820.00
M20-10		316 stainless steel pipework, couplings and pipe supports at WAS flowmeter chambers upstream of main sludge pump station	Sum	1	804617.00	R 804,617.00
		Allow for all costs and expenses in connection with the Site installation of the following:-				
M20-11		All materials and equipment summarized in Bill M20 complete (items 1 to 10).	Sum	1	231550.00	R 231,550.00
M20-12		316 stainless steel pipework, couplings and pipe supports at WAS flowmeter chambers upstream of main sludge pump station	Sum	1	37400.00	R 37,400.00
		Carried forward / ...				R 8,496,530.30

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 8,496,530.30
M20-13		**Other:-** All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **.....** **.....** **.....** **.....**	Item	-		
TOTAL OF BILL M20 CARRIED TO SUMMARY						**R 8,496,530.30**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 48	**BILL M21** **GRAVITY THICKENERS** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:**				
M21-1		Gravity Sludge Thickener Picket fence complete with drive unit and gearbox	No	2	1032157.64	R 2,064,315.28
M21-2		V-notch weirs	No	2		INCL
M21-3		Inlet pipework, manual and actuated valves, and stilling well	Sum	1	129791.20	R 129,791.20
M21-4		Supernatant withdrawal lines, including valves	Sum	1	184682.34	R 184,682.34
		Allow for all costs and expenses in connection with the Site installation of the following:-				
M21-5		Materials and equipment summarized in Bill M21 for items 1 to 4	Sum	1	228250.00	R 228,250.00
		Other:-				
M21-6		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify)	-	-		
		GRP Cover		1	8910.00	R 8,910.00
		Screeding of gravity thickener as per spec				
		13.5m floor diameter		2	66000.00	R 132,000.00
		……..				
		……..				
		……..				
M21-7		Supervision of screeding each gravity thickener to ensure mechanical contractor' requirement are met without damag to the equipemnt	Sum	1	28050.00	R 28,050.00
TOTAL OF BILL M21 CARRIED TO SUMMARY						**R 2,775,998.82**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 47	**BILL M22** **HYDROCYCLONES** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:** **Primary Sludge**				
M22-1		Primary sludge cyclone	No	2	395390.00	R 790,780.00
M22-2		Cyclone Support structure	No	1	373964.00	R 373,964.00
M22-3		All the pipework and valves associated with the primary sludge cyclones (including underflow piping, actuators, isolation valves, control valves and pressure gauges, etc. terminating at the discharge hoppers).	Sum	1	819272.00	R 819,272.00
M22-4		Custom designed overflow collection hopper and underflow launders to grit classifier.	Sum	1	316949.00	R 316,949.00
M22-5		Access platforms to access the cyclones and valves (as necessary)	Sum	1	493359.00	R 493,359.00
		WAS (Waste Activate Sludge)				
M22-6		WAS cyclone	No	2	321159.00	R 642,318.00
M22-7		Cyclone Support structure	No	1	70012.00	R 70,012.00
M22-8		All the pipework and valves associated with the WAS cyclones (including underflow piping, underflow piping, actuators, isolation valves, control valves and pressure gauges, etc. terminating at the discharge hoppers).	Sum	1	878022.00	R 878,022.00
M22-9		Custom designed overflow collection hopper and underflow collection hopper (with pipework terminating at the WAS holding tanks).	Sum	1	661617.00	R 661,617.00
M22-10		Access platforms to access the cyclones and valves (as necessary)	Sum	1	1235250.00	R 1,235,250.00
		Carried forward / ...				R 6,281,543.00

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 6,281,543.00
		Allow for all costs and expenses in connection with the Site installation of the following:-				
M22-11		All materials and equipment summarized in Bill M22 complete (items 1 to 10).	Sum	1	167508.00	R 167,508.00
M22-12		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **.....** **.....** **.....** **.....**	Item	-		
TOTAL OF BILL M22 CARRIED TO SUMMARY						**R 6,449,051.00**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 51, 52 & 53	**BILL M23** **BIOGAS HANDLING EQUIPMENT** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:** **Biogas pipework (and pipe supports) from digesters, including all condensate traps, drain pipes, valves, pressure valves, etc. terminating at:**				
M23-1		(a). Boiler house	Sum	1	1559388.83	R 1,559,388.83
M23-2		(b). Excess gas flare	Sum	1	1025741.58	R 1,025,741.58
M23-3		(c). Gas storage tanks	Sum	1	2167551.96	R 2,167,551.96
M23-4		Flame arrestors (all flame arresters installed within the digester complex).	Sum	1	900931.33	R 900,931.33
M23-5		Gas flow meters	No.	5	116452.34	R 582,261.70
		Gas Flare Equipment				
M23-6		Excess gas flare (complete with pilot operated valve, control panel, etc.)	No.	1	699847.60	R 699,847.60
M23-7		Steel Palisade fence (for excess gas flare).	Sum	1	170298.80	R 170,298.80
		Allow for all costs and expenses in connection with the Site installation of the following:-				
M23-8		All materials and equipment summarized in Bill M23, Items 1 to 5.	Sum	1	794749.40	R 794,749.40
M23-9		All materials and equipment summarized in Bill M23, Items 6 & 7.	Sum	1	114250.61	R 114,250.61
		Anaerobic Digesters				
M23-10		Provisional sum for digester roof equipmen (including but not limited to flame arresters pressure relief valves and pressure vacuun valves and any pipework, pipe supports, etc.). To include installation and commissioning	Prov sum	1	8 000 000	R 8,000,000.00
		Carried forward / ...				R 16,015,021.81

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 16,015,021.81
M23-11		Charge required by Contractor for above item	%	8 000 000		R 1,280,000.00
M23-12		Provisional sum for double membrane gas storage tanks (2 off) with combined storage capacity of 9020 m^3 (complete with flame arresters, pressure safety equipment, valves and any pipework, pipe supports, etc. as shown on relevant drawings). To include installation and commissioning	Prov sum	1	8 000 000	R 8,000,000.00
M23-13		Charge required by Contractor for above item	%	8 000 000		R 1,280,000.00
		Other:				
M23-14		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **.....** **.....** **.....** **.....**	Item	1		
TOTAL OF BILL M23 CARRIED TO SUMMARY						**R 26,575,021.81**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 50	**BILL M24** **SLUDGE HEATING EQUIPMENT** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:** **Water softening**				
M24-1		Package plant (complete with interconnecting pipes, intermediate pumps (as required), process units, etc).	Sum	1	444044.31	R 444,044.31
M24-2		Buffer storage tank (make-up water tank).	No.	1	234395.19	R 234,395.19
		Boiler Package				
M24-3		Boiler (complete with safety valves, isolation valves, pressure regulating equipment, gauges, control panel, etc.).	No	2	3080242.29	R 6,160,484.58
M24-4		Dual Fuel Burner (complete with integrated gas train, forced daft fan, fuel circulation pump, etc.).	No	2		INCL IN M24.3
M24-5		Chimney stack	No	2	82873.50	R 165,747.00
		Hot water recirculation				
M24-6		Boiler Feed Pumps (complete with gearboxes, couplings, motors, shafts, safety covers and guards, baseplates, etc.).	No	2	186001.21	R 372,002.42
M24-7		Hot water recirculation pipework (including pipe support, couplings, check valves, all isolation and control valves, gauges, instrumentation, etc.) between the boilers and heat exchangers.	Sum	1	6012360.08	R 6,012,360.08
M24-8		Insulation and cladding of Bill M24 Item 7 above	Sum	1	328595.19	R 328,595.19
		Sludge Heating and recirculation				
M24-9		Heat exchanger	No	2	769169.50	R 1,538,339.00
		Carried forward / ...				R 15,255,967.77

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 15,255,967.77
M24-10		Hot Sludge recirculation pump (complete with gearboxes, couplings, motors, shafts, safety covers and guards, baseplates, etc.).	No	2	468359.00	R 936,718.00
M24-11		Hot sludge recirculation pipework (including couplings, flange adapter, supports, instrumentation, etc) between the digesters and the heat exchangers.	Sum	1	3174651.75	R 3,174,651.75
M24-12		Insulation and cladding of Bill M24 Item 11 above	Sum	1	225944.58	R 225,944.58
	67	**Diesel Tank for Boiler**				
M24-13		Diesel storage tank (Complete with fuel delivery pipelines, all associated valves and connections, instrumentation, etc)	Sum	1	562819.28	R 562,819.28
		Allow for all costs and expenses in connection with the Site installation of the following:-				
M24-14		All materials and equipment for Bill M24 Items 1 and 2 above	Sum	1	180412.05	R 180,412.05
M24-15		All materials and equipment for Bill M24 Items 3 to 5 above	Sum	1	305110.85	R 305,110.85
M24-16		All materials and equipment for Bill M24 Items 6 to 8 above	Sum	1	312048.38	R 312,048.38
M24-17		All materials and equipment for Bill M24 Items 9 to 12 above	Sum	1	312048.38	R 312,048.38
M24-18		All materials and equipment for Bill M24 Item 13 above	Sum	1	206763.00	R 206,763.00
		Other:				
M24-19		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **……** **……** **……** **……**	Item	-		
TOTAL OF BILL M24 CARRIED TO SUMMARY						**R 21,472,484.04**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 49	**BILL M25** **ANAEROBIC DIGESTER SLUDGE EQUIPMENT** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:**				
M25-1		Hydraulic Mixing Pumps (End suction, non-clog type, centrifugal pumps complete with drive units, couplings, shafts, safety guards, baseplates, etc.).	No	3	2325489.00	R 6,976,467.00
M25-2		Suction and discharge pipework (including pipe supports, air release valves, isolation and control valves, gauges, etc.) for Item 1 above.	Sum	1	14263513.55	R 14,263,513.55
M25-3		Discharge mixing nozzles, scum and foam suppression equipment inside the digesters.	Sum	1		Included in M25-1
M25-4		Insulation and cladding of Bill M25 Item 2 above	Sum	1	300948.20	R 300,948.20
		Allow for all costs and expenses in connection with the Site installation of the following:-				
M25-5		Materials and equipment summarized in Bill M25 above.	Sum	1	286436.15	R 286,436.15
		Other:				
M25-6		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **……..** **……..** **……..** **……..**	Item	-		
TOTAL OF BILL M25 CARRIED TO SUMMARY						**R 21,827,364.90**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 49	**BILL M26** **SLUDGE HOLDING TANKS EQUIPMENT** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:** **WAS holding tanks**				
M26-1		Hydraulic Mixing Pumps (End suction, non-clog type, centrifugal pumps complete with drive units, couplings, shafts, safety guards, baseplates, etc.).	No	6	638918.00	R 3,833,508.00
M26-2		Pipework (including pipe supports, air release valves, isolation valve, control valves, guages, etc.) for Item 1 above.	Sum	1	11926826.00	R 11,926,826.00
M26-3		Internal tank assemblies (includes all internal pipework, floor mounted nozzles, foam dissipating equipment, etc.) for 4 WAS holding tanks	Sum	1	3620273.00	R 3,620,273.00
		Primary sludge holding tanks				
M26-4		Hydraulic Mixing Pumps (End suction, non-clog type, centrifugal pumps complete with drive units, couplings, shafts, safety guards, baseplates, etc.).	No.	3	691816.00	R 2,075,448.00
M26-5		Pipework (including pipe supports, air release valves, isolation valve, control valves, gauges, etc.) for Item 4 above.	Sum	1	4089118.00	R 4,089,118.00
M26-6		Internal tank assemblies (includes all internal pipework, floor mounted nozzles, foam dissipating equipment, etc.) for 2 primary sludge holding tanks	Sum	1	476241.00	R 476,241.00
		Computation Fluid Dynamics Analysis				
M26-7		Computation Fluid Dynamics Analysis for WAS Hydraulic Mixing Systems	Sum	1	130543.00	R 130,543.00
M26-8		Computation Fluid Dynamics Analysis for Primary Sludge Hydraulic Mixing Systems	Sum	1	130543.00	R 130,543.00
		Carried forward / ...				R 26,282,500.00

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 26,282,500.00
		Allow for all costs and expenses in connection with the Site installation of the following:-				
M26-9		All materials and equipment summarized in Bill M26 Items 1 and 2.	Sum	1	202664.00	R 202,664.00
M26-10		All materials and equipment summarized in Bill M26, Items 3).	Sum	1	82720.00	R 82,720.00
M26-11		All materials and equipment summarized in Bill M26 for Items 4 and 5).	Sum	1	101332.00	R 101,332.00
M26-12		All materials and equipment summarized in Bill M26, Items 6).	Sum	1	66176.00	R 66,176.00
		Other:				
M26-13		Provisional allowance for Fine bubble aeration system for the WAS holding tanks including blowers, pipework, supports, valves, diffuser discs, etc	Prov	1	10 000 000	R 10,000,000.00
M26-14		Charge required by Contractor on above item	%	10 000 000		R 1,600,000.00
M26-15		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify)	Item	-		
		WAS Ring Main Pipework 1 - HDPE 400	**Sum**	**1**	461486.00	R 461,486.00
		WAS Ring Main Pipework 1 - HDPE WAS	**Sum**	**1**	139943.00	R 139,943.00
		Ring Main Pipework 2 - HDPE 400 WAS	**Sum**	**1**	492392.00	R 492,392.00
		Ring Main Pipework 1 - HDPE WAS Ring	**Sum**	**1**	143233.00	R 143,233.00
		Main Pipework 1 - HDPE 200 WAS Ring	**Sum**	**1**	174654.00	R 174,654.00
		Main Pipework 1 - HDPE WAS Ring Main	**Sum**	**1**	122612.00	R 122,612.00
		Pipework 1 - HDPE 200 WAS Ring Main	**Sum**	**1**	157558.00	R 157,558.00
		Pipework 1 - HDPE	**Sum**	**1**	122612.00	R 122,612.00
		Primary Sludge Ring Main Pipework -	**Sum**	**1**	192254.00	R 192,254.00
		Primary Sludge Ring Main Pipework -	**Sum**	**1**	101755.00	R 101,755.00
		Primary Sludge Ring Main Pipework -	**Sum**	**1**	160711.00	R 160,711.00
		Primary Sludge Ring Main Pipework -	**Sum**	**1**	96409.00	R 96,409.00
TOTAL OF BILL M26 CARRIED TO SUMMARY						**R 40,701,011.00**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 58	**BILL M27** **SLUDGE DEWATERING EQUIPMENT** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:** **Primary Sludge Equipment**				
M27-1		Belt press feed pumps (Progressive cavity pumps complete with drive units, couplings, shafts, safety guards, baseplates, etc.).	No	4	419615.00	R 1,678,460.00
M27-2		Pipework (including pipe supports, pressure gauges, pressure and flow switches, pressure relief valves, isolation valves, control valves, etc.) for Item 1 above.	Sum	1	5927314.00	R 5,927,314.00
M27-3		Belt presses (complete with drive motor, gearbox, hydraulic unit, mixing unit, spray pipes, etc.)	No	4	7699420.00	R 30,797,680.00
M27-4		Belt press odour hoods	No.	4	364704.00	R 1,458,816.00
M27-5		Centralised lubrication system (per belt press).	No.	4	107058.00	R 428,232.00
		WAS Equipment				
M27-6		Linear screen feed pumps (Progressive cavity pumps complete with drive units, couplings, shafts, safety guards, baseplates, etc.).	No	10	518661.00	R 5,186,610.00
M27-7		Pipework (including pipe supports, pressure gauges, pressure and flow switches, pressure relief valves, isolation valves, control valves, etc.) for Item 6 above.	Sum	1	12381311.00	R 12,381,311.00
M27-8		Linear Screens (complete with drive motor, gearbox, mixing unit, etc.)	No	10	2395070.00	R 23,950,700.00
M27-9		Belt presses (complete with drive motor, gearbox, hydraulic unit, mixing unit, spray pipes, etc.)	No	10	7934922.00	R 79,349,220.00
M27-10		Transfer chute	No	10	53001.00	R 530,010.00
M27-11		Spreader box	No.	10	58815.00	R 588,150.00
		Carried forward / ...				R 162,276,503.00

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 162,276,503.00
M27-12		Centralised lubrication system	No	10	105633.00	R 1,056,330.00
		Sludge Cake Equipment				
M27-13		WAS and Primary Sludge Horizontal Screw Conveyor (complete including trough, covers, replaceable liners, shaftless screw, geared motor, discharge chutes and supports.)	No	6	965711.00	R 5,794,266.00
M27-14		WAS and Primary Sludge Horizontal screw conveyor discharge chute isolation valves (complete with actuators)	No.	10	146200.00	R 1,462,000.00
M27-15		WAS cake pumps (Progressive cavity pumps complete with drive units, couplings, shafts, safety guards, baseplates, etc.).	No	6	1702001.00	R 10,212,006.00
M27-16		WAS cake hopper(s) with motorised bridge breaker device	No.	6	205894.00	R 1,235,364.00
M27-17		WAS cake discharge pipework, terminating at the silo (including pipe supports, pressure gauges, pressure and flow switches, pressure relief valves, isolation valves, control valves, etc.) for Item 15 above.	Sum	1	8250472.00	R 8,250,472.00
M27-18		Primary sludge cake pumps (Progressive cavity pumps complete with drive units, couplings, shafts, safety guards, baseplates, etc.).	No	4	1703901.00	R 6,815,604.00
M27-19		Primary sludge cake hopper(s) with motorised bridge breaker device	No.	4	205894.00	R 823,576.00
M27-20		Primary sludge cake discharge pipework, terminating at the silos (including pipe supports, pressure gauges, pressure and flow switches, pressure relief valves, isolation valves, control valves, etc.) for Item 18 above.	Sum	1	5394382.00	R 5,394,382.00
M27-21		Total solids analyser (on sludge cake discharge pipes)	No.	10	575238.00	R 5,752,380.00
M27-22		Sludge cake lube pumps (Progressive cavity pumps complete with drive units, couplings, shaft guards, baseplates, etc	No	10	169656.00	R 1,696,560.00
M27-23		Sludge cake lube discharge pipework, terminating at the silos (including pipe supports, pressure gauges, pressure and flow switches, pressure relief valves, isolation valves, control valves, etc.) for Item 22 above.	Sum	1	1356015.00	R 1,356,015.00
		Access platforms, walkways and staircases				
		Carried forward / ...				R 212,125,458.00

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 212,125,458.00
M27-24		Allow for all the costs and expenses in connection with the design and certification of welded and bolted mild steel hot dipped galvanised walkways (including support frames, kicker plates, non-slip open floor grating, etc). Including 316 s/s handrailing.	Sum	1	640375.00	R 640,375.00
M27-25		Allow for all the costs and expenses in connection with the manufacture, corrosion protection, testing, supplying, delivery, offloading and storage of welded and bolted mild steel hot dipped galvanised walkways (including support frames, kicker plates, non-slip open floor grating, etc). Including 316 s/s handrailing.	Sum	1	16950909.00	R 16,950,909.00
		Allow for all costs and expenses in connection with the Site installation of the following:-				
M27-26		All materials and equipment summarized in Bill M27, Item 1 to 2).	Sum	1	115808.00	R 115,808.00
M27-27		All materials and equipment summarized in Bill M27, Items 3 to 5).	Sum	1	106032.00	R 106,032.00
M27-28		All materials and equipment summarized in Bill M27, Items 6 to 7).	Sum	1	289520.00	R 289,520.00
M27-29		All materials and equipment summarized in Bill M27, Items 8 to 12).	Sum	1	513240.00	R 513,240.00
M27-30		All materials and equipment summarized in Bill M27, Items 13 and 14).	Sum	1	304410.00	R 304,410.00
M27-31		All materials and equipment summarized in Bill M27, Items 15 to 17).	Sum	1	328192.00	R 328,192.00
M27-32		All materials and equipment summarized in Bill M27, Items 18 to 21).	Sum	1	256846.00	R 256,846.00
M27-33		All materials and equipment summarized in Bill M27, Items 22 and 23).	Sum	1	309166.00	R 309,166.00
M27-34		All materials and equipment summarized in Bill M27, Items 24 and 25).	Sum	1	799076.00	R 799,076.00
		Other:				
M27-35		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **……..**	Item	-		
TOTAL OF BILL M27 CARRIED TO SUMMARY						**R 232,739,032.00**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 61	**BILL M28** **CAKE SILO LIVE BOTTOMS** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:**				
M28-1		Live bottom for primary sludge cake silo (including motor, gearboxes, support structure troughs etc for 2 silos)	Sum	1	8219774.00	R 8,219,774.00
M28-2		Live bottom for WAS cake silo (including motor, gearboxes, support structure, troughs etc. for 2 silos)	Sum	1	8219774.00	R 8,219,774.00
M28-3		Pneumatically actuated valves for isolating flow from live bottom screw conveyors (for 4 silos)	Sum	1	2238434.00	R 2,238,434.00
M28-4		Pneumatically actuated flap gate and chute for evenly distribution of sludge cake into truck (including actuator) **Allow for all costs and expenses in connection with the Site installation of the following:-**	No	4	252787.00	R 1,011,148.00
M28-5		All materials and equipment summarized in Bill M28 complete **Other:-**	Sum	1	214555.00	R 214,555.00
M28-6		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **…….** **…….** **…….** **…….** **…….**	Item	-		
TOTAL OF BILL M28 CARRIED TO SUMMARY						**R 19,903,685.00**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 54, 55 & 56	**BILL M29** **POLYELECTROLYTE PREPARATION EQUIPMENT** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:**				
M29-1		Poly bag Unloader (complete with electrical hoist for bulk bags of up to 1000kg, a powder hopper). **Dry poly conveyance system:**	No	2	1467370.00	R 2,934,740.00
M29-2		Option 1: Flexible screw conveyor(s), complete with motor, gearbox, control panel, etc.	Sum	1	287530.00	R 287,530.00
M29-3		Option 2: Pneumatic conveyance, complete with eductors, blowers, pipework, control panels, etc.	Sum	1	314180.00	R 314,180.00
M29-4		Dehumidifier	No	1	187566.00	R 187,566.00
M29-5		Automatic poly preparation unit	No	2	1388338.00	R 2,776,676.00
M29-6		Poly solution distribution pipework (complete with pipe supports, valves, etc.), PVC pipes	Sum	1	183140.00	R 183,140.00
M29-7		Poly dosing pumps (Progressive cavity pumps complete with drive units, couplings, shafts, safety guards, baseplates, etc.).	No.	14	195973.00	R 2,743,622.00
M29-8		Pipework (including pipe supports, pressure gauges, pressure and flow switches, pressure relief valves, isolation valves, control valves, etc.) for Item 7 above.	Sum	1	5209232.00	R 5,209,232.00
M29-9		Poly injector	No	14		Included in M27-3 & M27-6
M29-10		In-line static mixer **Allow for all costs and expenses in connection with the Site installation of the following:-**	No	14	19089.00	R 267,246.00
		Carried forward / ...				R 14,903,932.00

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 14,903,932.00
M29-11		All materials and equipment summarized in Bill M29 complete (items 1 to 10).	Sum	1	324676.00	R 324,676.00
		Other:				
M29-12		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **.....** **.....** **.....** **.....**	Item	-		
TOTAL OF BILL M29 CARRIED TO SUMMARY						**R 15,228,608.00**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 62	**BILL M30** **COMBINED HEAT AND POWER (CHP) PLANT** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:**				
M30-1		Gas Engines (complete with engine gas train, base frame, lubrication system, alternator, etc.)	No	3	14031374.80	R 42,094,124.40
M30-2		Heat Recovery System (complete with hot water pumps, hot water circuits, heat exchangers, etc).	Sum	1	3644747.73	R 3,644,747.73
M30-3		Gas Cleaning Plant (complete with H2S removal, moisture removal, particulate removal, siloxane removal, all interconnecting pipework, valves, instruments etc.).	Sum	1	9995943.38	R 9,995,943.38
M30-4		Biogas pipework (between the gas storage tanks to the Gas Cleaning Plant, includes all valves, instruments, moisture traps, etc.).	Sum	1	2305314.44	R 2,305,314.44
M30-5		Biogas pipework (between the Gas Cleaning Plant and the CHP units, including all internal pipework, valves, instrumentation, gas boosters, etc. inside the Engine Room).	Sum	1	230718.09	R 230,718.09
M30-6		Fire extinguishers	No	10	2886.92	R 28,869.20
M30-7		Gas engine controllers (engine and master sync) and integrated control system, control cabling, network system, engine auxiliary power cabling and integration of engine controller with PCS and collector substation **Allow for all costs and expenses in connection with the Site installation of the following:-**	Sum	1	1524802.00	R 1,524,802.00
M30-8		All materials and equipment summarized in Bill M30 Item 1, 2 and 3 above.	Sum	1	734233.74	R 734,233.74
		Carried forward / ...				R 60,558,752.98

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 60,558,752.98
M30-9		All materials and equipment summarized in Bill M30 Item 4 and 5 above.	Sum	1	329414.46	R 329,414.46
M30-10		All materials and equipment summarized in Bill M30 Item 6 above.	Sum	1	35438.56	R 35,438.56
M30-11		All materials and equipment summarized in Bill M30 Item 7 above.	Sum	1	246884.34	R 246,884.34
		Other:				
M30-12		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify)	Item	-		
		Witness testing of CHP engines (Incl. flights and accommodation)	**Item**	**1**	226846.75	R 226,846.75
		Commissioning of CHP engines	**Item**	**1**	1547786.51	R 1,547,786.51
		Commissioning of gas cleaning systems	**Item**	**1**	317208.20	R 317,208.20
TOTAL OF BILL M30 CARRIED TO SUMMARY						**R 63,262,331.80**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 64	**BILL M31** **LIFTING EQUIPMENT** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:**				
M31-1		Lifting Equipment for Lower and Upper Screw Pump Stations	Sum	1	233302.00	R 233,302.00
M31-2		Lifting Equipment for Mechanical Front Raked Screens	Sum	1	253116.00	R 253,116.00
M31-3		Lifting Equipment for Perforated Plate Screens	Sum	1	185866.00	R 185,866.00
M31-4		Lifting Equipment for Main Sludge Pump Station	Sum	1	168454.00	R 168,454.00
M31-5		Gantry and lifting equipment for all R-recycle pump stations	Sum	1	312664.00	R 312,664.00
M31-6		Gantry and lifting equipment for all A-recycle pump stations	Sum	1	352044.00	R 352,044.00
M31-7		Gantry and lifting equipment for all RAS pump stations	Sum	1	453904.00	R 453,904.00
M31-8		Lifting Equipment for UV units: Crawl and hoist	Sum	1	581829.60	R 581,829.60
M31-9		Lifting equipment for Service water pump station	Sum	1	156411.00	R 156,411.00
M31-10		Lifting equipment for TSE pump station and filter building	Sum	1	272930.00	R 272,930.00
M31-11		Lifting equipment for Scum pump station	~~Sum~~	~~1~~		
M31-12		Lifting equipment for Return Flow pump station	Sum	1	366454.00	R 366,454.00
M31-13		Lifting equipment for Blower room: Overhead travelling crane	Sum	1	1896870.80	R 1,896,870.80
M31-14		Lifting equipment for Chlorine building: Overhead Travelling Crane	Sum	1	915425.00	R 915,425.00
M31-15		Lifting equipment for Dewatering Building: Overhead Travelling Cane	Sum	1	2446537.00	R 2,446,537.00
		Carried forward / ...				R 8,595,807.40

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 8,595,807.40
M31-16		Lifting Equipment for Polyelectrolyte Storage and Loading Area: Overhead Travelling Crane	Sum	1	649323.00	R 649,323.00
M31-17		Lifting equipment for CHP Engine room: Overhead Travelling crane	Sum	1	1626132.20	R 1,626,132.20
M31-18		Mobile gantry for mixers	Sum	1	146399.00	R 146,399.00
M31-19		Mobile gantry for mixers	Sum	1	146399.00	R 146,399.00
M31-20		Trolley for transporting mixers	Sum	1	107404.00	R 107,404.00
M31-21		Lifting Equipment Workshop: Overhead Travelling Crane	Sum	1	476234.00	R 476,234.00
		Allow for all costs and expenses in connection with the Site installation of the following:-				
M31-22		Lifting Equipment for Lower and Upper Screw Pump Stations	Sum	1	18452.00	R 18,452.00
M31-23		Lifting Equipment for Mechanical Front Raked Screens	Sum	1	19495.00	R 19,495.00
M31-24		Lifting Equipment for Perforated Plate Screens	Sum	1	15955.00	R 15,955.00
M31-25		Lifting Equipment for Main Sludge Pump Station	Sum	1	61952.00	R 61,952.00
M31-26		Gantry and lifting equipment for all R-recycle pump stations	Sum	1	61952.00	R 61,952.00
M31-27		Gantry and lifting equipment for all A-recycle pump stations	Sum	1	61952.00	R 61,952.00
M31-28		Gantry and lifting equipment for all RAS pump stations	Sum	1	61952.00	R 61,952.00
M31-29		Lifting Equipment for UV units: Crawl and hoist	Sum	1	61952.00	R 61,952.00
M31-30		Lifting equipment for Service water pump station	Sum	1	14405.00	R 14,405.00
M31-31		Lifting equipment for TSE pump station and filter building	Sum	1	20538.00	R 20,538.00
M31-32		Lifting equipment for scum pump station	~~Sum~~	~~1~~		
M31-33		Lifting equipment for Return flow pump station	Sum	1	61952.00	R 61,952.00
		Carried forward / ...				R 12,208,255.60

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 12,208,255.60
M31-34		Lifting equipment for Chlorine building: Overhead Travelling Crane	Sum	1	53753.00	R 53,753.00
M31-35		Lifting equipment for Dewatering Building: Overhead Travelling Cane	Sum	1	148183.00	R 148,183.00
M31-36		Lifting Equipment for Polyelectrolyte Storage and Loading Area: Overhead Travelling Crane	Sum	1	43884.00	R 43,884.00
M31-37		Workshop building Overhead Travelling crane	Sum	1	61952.00	R 61,952.00
M31-38		Lifting equipment for CHP Engine room: Overhead Travelling crane	Sum	1	61952.00	R 61,952.00
		Other:				
M31-39		Load testing of all lifting equipment	Sum	1	352827.00	R 352,827.00
M31-40		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **……** **……** **……** **……** **……**	Item	-		
TOTAL OF BILL M31 CARRIED TO SUMMARY						**R 12,930,806.60**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3A, Section A 65 & 66	**BILL M32** **VENTILATION SYSTEMS** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:**				
M32-1		Screw pump station buildings	Sum	1	416773.00	R 416,773.00
M32-2		Main sludge pump station dry well ventilation system	Sum	1	616000.00	R 616,000.00
M32-3		Blower House ventilation system	Sum	1	594000.00	R 594,000.00
M32-4		Boiler House ventilation system	Sum	1	203500.00	R 203,500.00
M32-5		Scum pump station	~~Sum~~	~~1~~		
M32-6		Service water pump station ventilation system	Sum	1	575398.00	R 575,398.00
M32-7		TSE pump station ventilation system	Sum	1	1715148.00	R 1,715,148.00
M32-8		Dewatering building ventilation system	Sum	1	2126398.00	R 2,126,398.00
M32-9		Poly storage room ventilation system	Sum	1	775148.00	R 775,148.00
M32-10		CHP Engine Building Room ventilation system	Sum	1	231000.00	R 231,000.00
M32-11		Inlet works MCC room split AC units	Sum	1	277173.00	R 277,173.00
M32-12		MV intake substation split AC units	Sum	1		
M32-13		PST MCC room (Main sludge pump station) split AC units	Sum	1	158723.00	R 158,723.00
M32-14		Blower MCC room split AC units	Sum	1	511704.00	R 511,704.00
M32-15		Bioreactor MCC room split AC units	Sum	1	287833.50	R 287,833.50
M32-16		Dewatering building MCC room split AC units	Sum	1	1480625.00	R 1,480,625.00
M32-17		UV & SST MCC room split AC units	Sum	1	313892.50	R 313,892.50
M32-18		Service water pump station MCC room split AC units	Sum	1	171752.50	R 171,752.50
M32-19		TSE pump station MCC room split AC units	Sum	1	319815.00	R 319,815.00
		Carried forward / ...				R 10,774,883.50

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 10,774,883.50
M32-20		Guard hut split AC units	Sum	1	29612.50	R 29,612.50
		Allow for all costs and expenses in connection with the Site installation of the following:-				
M32-21		Screw pump station buildings ventilation system	Sum	1	35413.00	R 35,413.00
M32-22		Main sludge pump station dry well ventilation system	Sum	1	145200.00	R 145,200.00
M32-23		Blower House ventilation system	Sum	1	231000.00	R 231,000.00
M32-24		Boiler House ventilation system	Sum	1	71500.00	R 71,500.00
M32-25		Scum pump station ventilation system	~~Sum~~	~~1~~		
M32-26		Service water pump station ventilation system	Sum	1	44558.00	R 44,558.00
M32-27		TSE pump station ventilation system	Sum	1	92587.00	R 92,587.00
M32-28		Dewatering building ventilation system	Sum	1	250399.00	R 250,399.00
M32-29		Poly storage room ventilation system	Sum	1	361522.00	R 361,522.00
M32-30		CHP Engine Builing Room ventilation system	Sum	1	242000.00	R 242,000.00
M32-31		MV intake substation split AC units	Sum	1		
M32-32		PST MCC room (Main sludge pump station) split AC units	Sum	1	66924.25	R 66,924.25
M32-33		Blower MCC room split AC units	Sum	1	171752.50	R 171,752.50
M32-34		Bioreactor MCC room split AC units	Sum	1	105420.50	R 105,420.50
M32-35		Dewatering building MCC room split AC units	Sum	1	419313.00	R 419,313.00
M32-36		UV & SST MCC room split AC units	Sum	1	130295.00	R 130,295.00
M32-37		Service water pump station MCC room split AC units	Sum	1	63963.00	R 63,963.00
M32-38		TSE pump station MCC room split AC units	Sum	1	64555.25	R 64,555.25
M32-39		Guard hut split AC units	Sum	1	14214.00	R 14,214.00
		Carried forward / ...				R 13,315,112.50

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 13,315,112.50
M32-40		**Other:** **All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify)** **P&G Ventilation** **.....** **.....** **.....** **.....**	Sum	1	1375000.00	R 1,375,000.00
TOTAL OF BILL M32 CARRIED TO SUMMARY						**R 14,690,112.50**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		BILL M33				
		SPARES				
		Allow for all costs and expenses in connection with the following items:				
	Vol 3A, Section A 17.11	**First Lift Archimedean Screw Pump**				
M33-1		Complete spare bottom bearing and all seals provided for Lower Archimedean screw pumps	No	4	309970.00	R 1,239,880.00
M33-2		Complete spare top bearing and all seals provided for Lower Archimedean screw pumps	No	4		Included in M33-1
M33-3		Bearing grease refills enough for 6 months for Lower Archimedean screw pumps	Sum	1		Included in M33-1
M33-4		Spare Grease Pump for all lower Archimedean screw pumps	No	4	45995.00	R 183,980.00
	17.11	**Second Lift Archimedean Screw Pump**				
M33-5		Complete spare bottom bearing and all seals provided for Upper Archimedean screw pumps	No	4	309970.00	R 1,239,880.00
M33-6		Complete spare top bearing and all seals provided for Upper Archimedean screw pumps	No	4		Included in M33-5
M33-7		Bearing grease refills enough for 6 months for Upper Archimedean screw pumps	Sum	1		Included in M33-5
M33-8		Spare Grease Pump for all upper Archimedean screw pumps	No	1	45995.00	R 45,995.00
	18.12	**Mechanical Front Rake Screens**				
M33-9		Screen field suitable for the Mechanical Front Rake screen supplied.	No	4	29901.00	R 119,604.00
M33-10		Set of Chains for rake mechanism suitable for the screen supplied.	No	8	12201.00	R 97,608.00
M33-11		Chain link sets complete with pins, rollers, inner and outer plates for replacing damaged chain sections for the screen supplied.	No	16	129800.00	R 2,076,800.00
		Carried forward / ...				R 5,003,747.00

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 5,003,747.00
M33-12		Set of bottom bearings and stub shaft/Return mechanism suitable for the screen supplied. All wearing parts to be supplied	No	8	9165.00	R 73,320.00
M33-13		Complete gear motor and torque limiter for rake drive suitable for the screen supplied	No	1	86678.00	R 86,678.00
M33-14		Set of rakes suitable for the screen supplied including chain attachments and fasteners	No	16	12201.00	R 195,216.00
M33-15		Replaceable wiper blade for clearing screenings off rakes	No	1	900.00	R 900.00
	18.12	**Perforated Belt Press**				
M33-16		One Rotary Brush per screen	No	4	76131.00	R 304,524.00
M33-17		Complete gear motor and torque limiter for rake drive suitable for the screen supplied	No	1	92365.00	R 92,365.00
M33-18		Set of OEM recommended spares for each perforated plate belt screen	No	4	99082.00	R 396,328.00
	21.13	**Wash Compactors**				
M33-19		Set of two Wash press brushes for each screw press	No	8	4770.00	R 38,160.00
M33-20		Through liners, screw and complete set of screw bearings for each wash press supplied	Sum	1	109550.00	R 109,550.00
M33-21		Complete spare set of Motor and Gearbox for the mixer/agitator of the wash press supplied	No	4	14006.00	R 56,024.00
M33-22		Complete spare set of Motor and Gearbox for the screw conveyor of the wash press supplied	No	1	25243.00	R 25,243.00
M33-23		One drain ball valve, complete with actuator, per wash compactor	Sum	1	102105.00	R 102,105.00
M33-24		One Hydrostatic level control instrument	No	1	7328.00	R 7,328.00
	20.12	**Wash Launders**				
M33-25		Actuated valve for wash water launder	No	2	71797.00	R 143,594.00
	22.12	**Degritting System**				
		Carried forward / ...				R 6,635,082.00

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 6,635,082.00
M33-26		Complete Motor and Gearbox set for Vortex degritters supplied	No	2	27789.00	R 55,578.00
M33-27		Spare Electrical Actuator for grit withdrawal valve of the vortex degritter.	No	2	77858.00	R 155,716.00
	23.13	**Grit Classifiers**				
M33-28		Complete motor and gearbox set for Mixer/paddle of the grit classifiers supplied	No	1	28164.00	R 28,164.00
M33-29		Complete motor and gearbox set for screw conveyors supplied	No	1	103580.00	R 103,580.00
M33-30		Through liners, screw and complete set of screw bearings for the conveyors of each grit classifiers supplied	Sum	1	51316.00	R 51,316.00
	31.9	**FBDA (Including Blowers)**				
M33-31		Spare actuator to regulate diffuser vanes for each Blower supplied.	No	16		Included
M33-32		Blower Oil Refill for the blowers supplied	Sum	1		Included
M33-33		All special tools for blower maintenance	No	2		Included
M33-34		Diffuser bodies complete with membranes	No	100	716.10	R 71,610.00
M33-35		Blower inlet filters- two per unit supplied fully sealed in original packaging.	No	16		Included
M33-36		Acoustic enclosure cooling fan including motor	No	4		Included
	28.11	**Primary Settling Tanks**				
M33-37		One wheel set (one drive and one non drive wheel) for each PST	No	4	9900.00	R 39,600.00
M33-38		Spare electrical actuator for PST desludge valve	No	4	88851.03	R 355,404.12
M33-39		Spare Motor and Gearbox for PST bridge	No	1	45082.40	R 45,082.40
	29.12	**Vertical Shaft Mixers**				
M33-40		Spare sets of Motor and Gearbox for flow balancing tank mixers	No	4	127842.00	R 511,368.00
M33-41		Spare sets of Motor and Gearbox for Anoxic Zone mixers	No	5	175450.00	R 877,250.00
M33-42		Spare sets of Motor and Gearbox for Anaerobic Zone mixers	No	3	127842.00	R 383,526.00
		Carried forward / ...				R 9,313,276.52

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 9,313,276.52
	30.14	**Recycle Pumps**				
M33-43		A recycle Pump spares (including oil change and V belt set) for each pump	No	12	22462.92	R 269,555.04
M33-44		R recycle Pump spares (including oil change and V belt set) for each pump	No	8	7140.38	R 57,123.04
M33-45		Complete Spare A - recycle pump (including motor, gearbox, shaft with impeller, etc)	No	1	371339.10	R 371,339.10
M33-46		Complete Spare R - recycle pump (including motor, gearbox, shaft with impeller, etc)	No	1	241280.60	R 241,280.60
	35.12	**RAS Pumps**				
M33-47		Complete Spare RAS Pump	No	1	537925.30	R 537,925.30
	33.13	**Secondary Settling Tank**				
M33-48		One wheel set (one drive and one non drive wheel) for each SST	No	12	9900.00	R 118,800.00
M33-49		Spare sets of Motor and Gearbox for SST bridge	No	2	45082.40	R 90,164.80
M33-50		Spare electrical actuator for SST desludge valve	No	12	81382.32	R 976,587.84
	36.12 & 37.12	**UV Disinfections**				
M33-51		100% of total number of Lamps supplied	Sum	1	4790252.55	R 4,790,252.55
M33-52		20% of total number of Ballast supplied	Sum	1	757500.25	R 757,500.25
M33-53		1 UVT sensor	No	1	495979.74	R 495,979.74
M33-54		Hydraulic system oil filters for each hydraulic unit	Sum	1	8602.44	R 8,602.44
M33-55		20% of total Quartz sleeves, include O-rings supplied.	Sum	1	411968.70	R 411,968.70
M33-56		6 A Fuses class CC	No	2	842.07	R 1,684.14
M33-57		10 A Fuses class CC	No	2	842.07	R 1,684.14
M33-58		Wiper kit	No	9	2857.36	R 25,716.24
M33-59		Set of supplier recommended spares for each mechanical screen upstream of UV	Sum	1	483191.81	R 483,191.81
	40.12	**TSE Pumpstation**				
		Carried forward / ...				R 18,952,632.25

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 18,952,632.25
M33-60		Oil change per pump	No	7	6660.00	R 46,620.00
	41.8	**Service Water Pumpstation**				
M33-61		Oil change per pump	No	5	6660.00	R 33,300.00
	34.13	**Scum Pumpstation**				
M33-62		Scum Pump spares (including rotor and Stator) for each pump	No	2		
	42.10	**Return Flow Pumpstation**				
M33-63		Spare set of mechanical seals	No	1	18480.00	R 18,480.00
	44.13	**Screening Press Feed Pumpstation**				
M33-64		Seal kit (Mechanical seals, volute seals, backplate gasket, seal cap gaskets, impeller cap screw, impeller washer, impeller key, impeller nut), as applicable.	Sum	1	27807.00	R 27,807.00
M33-65		Wear Ring Kit (Wear rings)	Sum	1	6968.00	R 6,968.00
M33-66		Sleeves (Bronze or stainless steel, whichever is applicable).	Sum	1	5898.00	R 5,898.00
M33-67		Bearing Frame Kit (Ball bearings, moisture seals, retaining rings).	Sum	1	12571.00	R 12,571.00
	46.13, 56.12 & 60.12	**Progressive Cavity Pumps**				
M33-68		Thickener feed Pump spares (including rotor and stator)	No	2	696632.20	R 1,393,264.40
M33-69		Complete Spare Thickener Pump	No	1	661774.30	R 661,774.30
M33-70		Digester feed Pump spares (including rotor and stator)	No	2	386787.50	R 773,575.00
M33-71		WAS Transfer Feed Pump spares (including rotor and stator) at Multipurpose sludge pump station	No	3	695715.54	R 2,087,146.62
M33-72		WAS Transfer Pump spares (including rotor and stator), Dewatering	No	10	262740.00	R 2,627,400.00
M33-73		Complete Spare pump for Dewatering WAS transfer pump	No	1	290891.00	R 290,891.00
M33-74		Primary Sludge Transfer Pump spares (including rotor and stator), Dewatering	No	4	262740.00	R 1,050,960.00
		Carried forward / ...				R 27,989,287.57

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 27,989,287.57
M33-75		Complete Spare pump for Dewatering Primary Sludge transfer pump	No	1	262740.00	R 262,740.00
M33-76		Poly dosing Pump spares (including rotor and stator)	No	14	34562.00	R 483,868.00
M33-77		Complete spare pump for poly dosing	No	2	185498.00	R 370,996.00
M33-78		Primary Sludge Cake pump spares (including rotor and stator)	No	4	537843.00	R 2,151,372.00
M33-79		Complete spare primary sludge cake pump	No	1	1438336.00	R 1,438,336.00
M33-80		WAS Cake pump spares (including rotor and stator)	No	6	537843.00	R 3,227,058.00
M33-81		Complete spare WAS cake pump	No	1	1438336.00	R 1,438,336.00
	58.17	**Linear Screens**				
M33-82		Belt	No	10	18748.00	R 187,480.00
M33-83		Belt scraper blade	No	10	3983.00	R 39,830.00
M33-84		Ramp scraper blade	No	10	8682.00	R 86,820.00
M33-85		Rubber profile	No	50	259.00	R 12,950.00
M33-86		Spray Nozzle	No	40	388.00	R 15,520.00
M33-87		Brush for spray pipe	No	10	38216.00	R 382,160.00
	58.17	**Belt Presses**				
M33-88		Rubber Profile	No	60	259.00	R 15,540.00
M33-89		Set Vertical Seal	No	7	37591.00	R 263,137.00
M33-90		Set Hydraulic Seal for Piston	No	28	3404.00	R 95,312.00
M33-91		Filter Hydraulic unit	No	7	604.00	R 4,228.00
M33-92		Spare Hydraulic Unit	No	2	64389.00	R 128,778.00
M33-93		Set Hydraulic Seal for Belt tracking unit	No	14	3038.00	R 42,532.00
M33-94		Set of seals for Hydraulic Switch	No	14	2262.00	R 31,668.00
M33-95		Spring for sensing paddle	No	14	151.00	R 2,114.00
M33-96		Spray Nozzle	No	60	388.00	R 23,280.00
M33-97		Brush Spray Pipe	No	14	38216.00	R 535,024.00
M33-98		Scraper Blades	No	14	3684.00	R 51,576.00
		Carried forward / ...				R 39,279,942.57

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 39,279,942.57
M33-99		Upper Belt	No	14	52347.00	R 732,858.00
M33-100		Lower Belts	No	14	52347.00	R 732,858.00
	54.12 59.12,	**Screw Conveyors in Dewatering Building**				
M33-101		Spares for Flexible Conveyors (Including Through Liner, screw and screw bearings) @ Poly make-up	Sum	1	42154.00	R 42,154.00
M33-102		Complete spare motor and gearbox for flexible conveyors @ poly make-up	No	1	27606.00	R 27,606.00
M33-103		Spares for Primary sludge cake conveyors (Including Through Liner, screw and screw bearings)	Sum	1	124898.00	R 124,898.00
M33-104		Complete spare motor and gearbox for Primary sludge cake conveyors	No	1	92019.00	R 92,019.00
M33-105		Spares for Primary sludge silo 1 live bottom conveyors (Including Through Liner, screw and screw bearings)	Sum	1	548548.00	R 548,548.00
M33-106		Complete spare motor and gearbox for Primary sludge silo 1 live bottom conveyors	No	1	191309.00	R 191,309.00
M33-107		Spares for Primary sludge silo 2 live bottom conveyors (Including Through Liner, screw and screw bearings)	Sum	1	548548.00	R 548,548.00
M33-108		Complete spare motor and gearbox for Primary sludge silo 2 live bottom conveyors	No	1	191309.00	R 191,309.00
M33-109		Spares for WAS cake conveyors (Including Through Liner, screw and screw bearings)	Sum	1	353227.00	R 353,227.00
M33-110		Complete spare motor and gearbox for WAS cake conveyors	No	1	92019.00	R 92,019.00
M33-111		Spares for WAS silo 1 live bottom conveyors (Including Through Liner, screw and screw bearings)	Sum	1	548548.00	R 548,548.00
M33-112		Complete spare motor and gearbox for WAS silo 1 live bottom conveyors	No	1	191309.00	R 191,309.00
M33-113		Spares for WAS silo 2 live bottom conveyors (Including Through Liner, screw and screw bearings)	Sum	1	548548.00	R 548,548.00
M33-114		Complete spare motor and gearbox for WAS silo 2 live bottom conveyors	No	1	191309.00	R 191,309.00
		Carried forward / ...				R 44,437,009.57

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 44,437,009.57
	50.12	**Sludge Heating**				
M33-115		Boiler Feed water Pump spares (including oil change)	Sum	1	18604.30	R 18,604.30
	49.12	**Sludge Recirculation pumps @ Heat Exchangers**				
M33-116		Seal kit (Mechanical seals, volute seals, backplate gasket, seal cap gaskets, impeller cap screw, impeller washer, impeller key, impeller nut), as applicable.	Sum	1	289103.10	R 289,103.10
M33-117		Wear Ring Kit (Wear rings)	Sum	1	258094.10	R 258,094.10
M33-118		Sleeves (Bronze or stainless steel, whichever is applicable).	Sum	1	159735.40	R 159,735.40
M33-119		Bearing Frame Kit (Ball bearings, moisture seals, retaining rings).	Sum	1	31009.00	R 31,009.00
	50.12	**Hot Water Boilers**				
M33-120		Burner controller ignition flame optic sensor	No	2	82168.90	R 164,337.80
M33-121		Boiler feed water stage pumps	No	2	9302.70	R 18,605.40
M33-122		Spare valves that are used on the boiler system	Sum	1	238553.70	R 238,553.70
	55.12	**Automatic Poly preparation Unit**				
M33-123		Spares for dry Feeder screw (Including Through Liner and screw bearings)	Sum	1	28531.00	R 28,531.00
M33-124		HDPE Y-Strainer: 1 x	No	1	1999.00	R 1,999.00
M33-125		HDPE Ball Valve: 1 x	No	1	2206.00	R 2,206.00
M33-126		Water Feed valve solenoid: x 1	No	1	6247.00	R 6,247.00
M33-127		Water Feed line pressure regulating valve: 1 x	No	1	9015.00	R 9,015.00
M33-128		Dry material feeder vibrator: x 1	No	1	8144.00	R 8,144.00
M33-129		Level instrument (ultrasonic): x 1	No	1	27896.00	R 27,896.00
M33-130		Dehumidifier	No	1	183218.00	R 183,218.00
	49.12	**Sludge Recirculation Pumps for Primary sludge Holding Tanks**				
		Carried forward / ...				R 45,882,308.37

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 45,882,308.37
M33-131		Seal kit (Mechanical seals, volute seals, backplate gasket, seal cap gaskets, impeller cap screw, impeller washer, impeller key, impeller nut), as applicable.	Sum	1	27807.00	R 27,807.00
M33-132		Wear Ring Kit (Wear rings)	Sum	1	6968.00	R 6,968.00
M33-133		Sleeves (Bronze or stainless steel, whichever is applicable).	Sum	1	5898.00	R 5,898.00
M33-134		Bearing Frame Kit (Ball bearings, moisture seals, retaining rings).	Sum	1	12571.00	R 12,571.00
	49.12	**Sludge Recirculation Pumps for WAS Holding Tanks**				
M33-135		Seal kit (Mechanical seals, volute seals, backplate gasket, seal cap gaskets, impeller cap screw, impeller washer, impeller key, impeller nut), as applicable.	Sum	1	27807.00	R 27,807.00
M33-136		Wear Ring Kit (Wear rings)	Sum	1	6968.00	R 6,968.00
M33-137		Sleeves (Bronze or stainless steel, whichever is applicable).	Sum	1	5898.00	R 5,898.00
M33-138		Bearing Frame Kit (Ball bearings, moisture seals, retaining rings).	Sum	1	12571.00	R 12,571.00
	49.12	**Sludge Recirculation Pumps for Digesters**				
M33-139		Seal kit (Mechanical seals, volute seals, backplate gasket, seal cap gaskets, impeller cap screw, impeller washer, impeller key, impeller nut), as applicable.	Sum	1	543768.97	R 543,768.97
M33-140		Wear Ring Kit (Wear rings)	Sum	1	428731.17	R 428,731.17
M33-141		Sleeves (Bronze or stainless steel, whichever is applicable).	Sum	1	399339.76	R 399,339.76
M33-142		Bearing Frame Kit (Ball bearings, moisture seals, retaining rings).	Sum	1	115037.81	R 115,037.81
	47.11	**PS Hydro cyclones**				
M33-143		Wear liner kit (1 x cone liner, 1 x feed box wear liner , 1 x vortex finder wear liner, 1 x spigot liner)	Sum	1	49252.00	R 49,252.00
M33-144		1 x Spigot (1 size smaller)	No	1	976.00	R 976.00
M33-145		1 x Spigot (1 size bigger)	No	1	919.00	R 919.00
		Carried forward / ...				R 47,526,821.08

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 47,526,821.08
	47.11	**WAS Hydro cyclones**				
M33-146		Wear liner kit (1 x cone liner, 1 x feed box wear liner, 1 x vortex finder wear liner, 1 x spigot liner)	Sum	1	64069.00	R 64,069.00
M33-147		1 x Spigot (1 size smaller)	No	1	749.00	R 749.00
M33-148		1 x Spigot (1 size bigger)	No	1	671.00	R 671.00
	51.9	**Biogas Pipelines**				
M33-149		Flame Arresters (1 flame arrester for each size installed on site).	Sum	1	706783.14	R 706,783.14
	62.14	**CHP Installation**				
M33-150		Supplier recommended spares for Gas Conditioning Facility	Sum	1	722719.88	R 722,719.88
M33-151		Supplier recommended spares for Gas Holding Tanks	Sum	1		
M33-152		Supplier recommended spares for Gas Engines and Heat Recovery Units	Sum	1	2563964.92	R 2,563,964.92
M33-153		Battery	No	1	19879.52	R 19,879.52
M33-154		Battery Charger	No	1	15903.62	R 15,903.62
M33-155		Gas supply instruments (one of each used)	Sum	1	53232.44	R 53,232.44
M33-156		Engine Controller	No	1	2143831.54	R 2,143,831.54
M33-157		complete engine gasket set	No	3	464897.16	R 1,394,691.48
M33-158		complete engine fanbelt	No	3		N/A
M33-159		complete air filter set	No	6		INCL IN M33-152
M33-160		complete fuel (gas) filter set	No	6	101853.39	R 611,120.34
M33-161		complete oil filter set	No	6		INCL IN M33-152
M33-162		All other spares as per OEM's recommended list	Sum	1		
		WAS Holding tank FBDA (Including Blowers)				
M33-163		Provisional allowance for WAS holding tank FBDA spares (including blowers and diffuser discs, etc)	Prov	1	20 000	R 20,000.00
M33-164		Charge required by Contractor for above item	%	20 000		R 3,200.00
		Carried forward / ...				R 55,847,636.96

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 55,847,636.96
	48.12	**Primary Sludge Screening Equipment**				
M33-165		Screening zone screen	No	1	370933.00	R 370,933.00
M33-166		Screening zone screw	No	1	185467.00	R 185,467.00
M33-167		Pressing zone screen	No	1	278200.00	R 278,200.00
M33-168		Pressing zone screw	No	1	278200.00	R 278,200.00
M33-169		Pressing zone liner	No	1	649133.00	R 649,133.00
	48.12	**Gravity thickener**				
M33-170		Spare motor/gearbox	No	1	99000.00	R 99,000.00
	27.14	**Odour control (Inlet works)**				
M33-171		Set of supplier recommended critical spares	Sum	1	48125.00	R 48,125.00
M33-172		Spare extraction fan	No	1	372900.00	R 372,900.00
	27.14	**Odour control (Gravity thickener and main sludge PS)**				
M33-173		Set of supplier recommended critical spares	Sum	1	48125.00	R 48,125.00
M33-174		Spare extraction fan	No	1	258500.00	R 258,500.00
	63.17	**Odour control (Primary sludge holding tanks and Primary sludge belt presses)**				
M33-175		Set of supplier recommended critical spares	Sum	1	48125.00	R 48,125.00
M33-176		Spare extraction fan	No	1	311300.00	R 311,300.00
		EC&I Spares				
M33-177		Primary MV switchgear spares	Sum	1	603227.00	R 603,227.00
M33-178		Secondary MV switchgear spares	Sum	1	136488.00	R 136,488.00
M33-179		Distribution Transformer spares	Sum	1	1392622.00	R 1,392,622.00
M33-180		Isolation Transformer spares	Sum	1	144196.00	R 144,196.00
M33-181		NER and NEC spares, as directed by the Engineer	Prov Sum	1	175 000	R 175,000.00
M33-182		Percentage adjustment on above item for Contractor's overheads and profit	%	175 000		R 28,000.00
		Carried forward / ...				R 61,275,177.96

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 61,275,177.96
M33-183		MV cabling spares	Sum	1		
M33-184		LV Switchgear, control assemblies and VFCs spares	Sum	1	2732702.61	R 2,732,702.61
M33-185		Diesel Generators spares	Sum	1	440204.00	R 440,204.00
M33-186		Instrumentation spares	Sum	1	1358136.58	R 1,358,136.58
M33-187		Control and fibre network spares	Sum	1	1473467.37	R 1,473,467.37
M33-188		SCADA spares	Sum	1	676421.27	R 676,421.27
M33-189		PLC spares	Sum	1	466589.76	R 466,589.76
		Other:				
M33-190		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **.....** **.....** **.....** **.....** **.....**	Item	-		
TOTAL OF BILL M33 CARRIED TO SUMMARY						**R 68,422,699.55**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		BILL M34				
		SUNDRIES				
		Allow for all costs and expenses in connection with the following items:				
	Vol 3A, Section A					
M34-1		Hazop Study and appointment of independent Consultant	Sum	1	880415.00	R 880,415.00
M34-2		Providing "as built" drawings	Sum	1	499137.86	R 499,137.86
M34-3		Providing 2 draft copies of the Installation, Operation and Maintenance Manual prior to commissioning of the Works	Sum	1	520850.00	R 520,850.00
M34-4		Providing 4 final hard copies of the Installation, Operation and Maintenance Manual prior to the Issue of the Taking-Over Certificate(to include digital copy)	No	4	131850.50	R 527,402.00
M34-5		Signage (plant wide)	Sum	1	87000.00	R 87,000.00
M34-6		Precautions against flooding of the Works	Sum	1	218675.00	R 218,675.00
M34-7		Checking, starting up, testing and pre-commissioning	Sum	1	2309603.86	R 2,309,603.86
M34-8		Commissioning of the Works	Sum	1	6302530.20	R 6,302,530.20
M34-9		Performance Acceptance Testing (Pre-commissioning and Commissioning Testing)	Sum	1	860530.43	R 860,530.43
M34-10		Providing a commissioning test report	Sum	1	179025.00	R 179,025.00
M34-11		Trial Operation Period	Sum	1	4716226.03	R 4,716,226.03
M34-12		Cost of fuel (Diesel) for up to 6 hours per day (including delivery) for the duration of precommissioning, commissioning and Trial Operation Period	Sum	1	39499812.00	R 39,499,812.00
M34-13		All consumables required for item 11 above	Sum	1	7973270.75	R 7,973,270.75
M34-14		Operational and Maintenance Training	Sum	1		Included in M35-40
	7.1	**Allow for separate return flights, car hire, accommodation and subsistence costs incurred in optional factory inspections, outside the Cape Metropolitan Area, by the City of Cape Town Engineer and his representative (three pax.) for equipment in this schedule**				
M34-15		a. Archimedean screw pumps	Sum	1	276360.00	R 276,360.00
M34-16		b. Mechanical screens, washer compactors, grit removal equipment	Sum	1	329940.00	R 329,940.00
		Carried forward / ...				R 65,180,778.13

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 65,180,778.13
M34-17		c. Sluice Gates	Sum	1	53580.00	R 53,580.00
M34-18		d. FBDA system components (blowers, diffusers, etc.)	Sum	1	284350.00	R 284,350.00
M34-19		e. Ultrasonic (UV) disinfection equipment	Sum	1	284350.00	R 284,350.00
M34-20		f. Multi-stage centrifugal pumps (TSE Pump Station)	Sum	1	53580.00	R 53,580.00
M34-21		g. Progressive Cavity Pumps (for solids concentration of 4 % and greater).	Sum	1	560710.00	R 560,710.00
M34-22		h. Belt presses and linear screens	Sum	1	552720.00	R 552,720.00
M34-23		i. Biogas engines (and related heat recovery units).	Sum	1	284350.00	R 284,350.00
M34-24		Inspection, Tests, etc. of electrical panels and other electrical equipment outside the municipal area other than the contract Site	Item	1	597840.00	R 597,840.00
M34-25		Other tests and inspections not listed in M34-15 to M34-24 above, which is also required to be inspected by the Engineer and Employer	Sum	1	214320.00	R 214,320.00
		Storage of equipment where storage space				
M34-26		a. The Contractor	m³-month	1	132.00	R 132.00
M34-27		b. The Council	m³-month	1	132.00	R 132.00
M34-28		Provision of all Test Certificates and Certificate of Compliance in terms of the Code of Practice for Wiring of Premises	Item	1	40375.00	R 40,375.00
M34-29		Allowance for inspections by Engineer or other sub-consultant	Prov	1	5 000 000	R 5,000,000.00
M34-30		Charge required by Contractor for above item	%	5 000 000		R 800,000.00
M34-31		Provisional allowance for any additional supply only work as directed by the Engineer	Prov	1	8 000 000	R 8,000,000.00
M34-32		Charge required by Contractor on above item (shall only cover "General Requirements and Conditions" and "Contractor's overhead charges")	%	8 000 000		R 1,280,000.00
M34-33		Provisional allowance for any additional design, supply, install, test and commission work as directed by the Engineer	Prov	1	10 000 000	R 10,000,000.00
		Carried forward / ...				R 93,187,217.13

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 93,187,217.13
M34-34		Charge required by Contractor on above item (shall only cover "General Requirements and Conditions" and "Contractor's overhead charges")	%	10 000 000		R 1,600,000.00
M34-35		Provisional allowance for any additional design, fabricate, install, test and commission work as directed by the Engineer	Prov	1	10 000 000	R 10,000,000.00
M34-36		Charge required by Contractor on above item (shall only cover "General Requirements and Conditions" and "Contractor's overhead charges")	%	10 000 000		R 1,600,000.00
M34-37		Allowance for design changes as forthcoming from HAZOP workshop	Prov	1	5 000 000	R 5,000,000.00
M34-38		Charge required by Contractor for above item	%	5 000 000		R 800,000.00
		Decommissioning and removal of existing equipment				
M34-39		Decommissioning, making safe and removal of all process and mechanical equipment to contractor fenced yard on site	Sum	1	2809373.75	R 2,809,373.75
		Daywork (provisional)				
		Allow for the cost of all labour (at full cost of employment), materials and plant, H&S PPE and induction, overheads and profit, superintendance and management				
M34-40		Project Management (Contractor's representative)	hr	240	1636.32	R 392,716.80
M34-41		Commissioning engineer	hr	80	1456.00	R 116,480.00
M34-42		Project Engineering (Design engineer)	hr	200	1456.00	R 291,200.00
M34-43		Drawing office (Drafting)	hr	200	900.48	R 180,096.00
M34-44		Construction Management (General foreman)	hr	240	1456.00	R 349,440.00
M34-45		Skilled labour (Artisan)	hr	240	720.00	R 172,800.00
M34-46		Unskilled labour (Labourer)	hr	400	180.00	R 72,000.00
TOTAL OF BILL M34 CARRIED TO SUMMARY						**R 116,571,323.68**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		BILL M35				
		PROCESS CONTROL ASSISTANCE, MAINTENANCE AND TRAINING (FULL TIME)				
		Allow for all costs and expenses in connection with the following items:				
		Preliminary and General				
		Preliminary and General Costs (Payment Item OMT1 as per Part C3.4.9.3.d):				
M35-1		Providing insurances for Maintenance for a total period of 12 months after the Phase 1 (Section) Trial Operation Period	Sum	1	645426.63	R 645,426.63
		Health and Safety:				
M35-2		General obligations in compliance with the Occupational Health & Safety Act, Construction Regulations 2014 and the Occupational Health and Safety Specification for a total period of twelve months after the Trial Operation Period	Sum	1	276908.14	R 276,908.14
M35-3		Risk assessment	Sum	1	48075.00	R 48,075.00
M35-4		Preparation of Health and Safety Plan	Sum	1	57425.00	R 57,425.00
M35-5		Provision of Health and Safety specialist	Sum	1	229700.00	R 229,700.00
M35-6		Induction training of Employer's and Contractor's staff	Sum	1	115638.00	R 115,638.00
M35-7		Baseline medical assessment of employees before commencing work on site	Sum	1	85942.78	R 85,942.78
M35-8		Site establishment	Sum	1	70780.00	R 70,780.00
M35-9		Removal of site establishment	Sum	1	39100.00	R 39,100.00
M35-10		Other general expenses incurred in complying with the requirements of the Scope of Work not included above (specify): **……..** **……..**	Item	-		
M35-11		(a) Plant	Sum/ day	5	9350.00	R 46,750.00
M35-12		(b) Labour	Sum/ day	2	9273.00	R 18,546.00
		Carried forward / ...				R 1,634,291.55

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 1,634,291.55
M35-13		(c) Supervision	Sum/ day	1	7040.00	R 7,040.00
M35-14		(d) Other services, facilities, etc. not covered by (a), (b) and (c) above	Sum/ day	2		
M35-14a		Other general expenses incurred in complying with the requirements of the Scope of Work not included above (specify): **.....** **.....** **.....**	Item			
		Process Control: Assistance, Maintenance of Works (Full time - Payment Item OMT2 as per Part C3.4.9.3.d)				
M35-15		Inlet Works: Screw pumps, Screening and degritting	Month	12	115832.00	R 1,389,984.00
M35-16		Emergency tank	Month	1	23167.00	R 23,167.00
M35-17		PSTs	Month	12	108438.00	R 1,301,256.00
M35-18		Biological Reactor	Month	12	108438.00	R 1,301,256.00
M35-19		Blower Building	Month	12	86042.00	R 1,032,504.00
M35-20		SSTs	Month	12	108438.00	R 1,301,256.00
M35-21		UV Units	Month	12	134332.00	R 1,611,984.00
M35-22		Chlorination	Month	1	23167.00	R 23,167.00
M35-23		Gravity thickeners	Month	12	72292.00	R 867,504.00
M35-24		Anaerobic digesters	Month	12	154823.55	R 1,857,882.60
M35-25		Gas holding tanks	Month	12		Incl in M35.26
M35-26		CHP facility	Month	12	300252.97	R 3,603,035.64
M35-27		WAS holding tanks	Month	12	38611.00	R 463,332.00
M35-28		Primary sludge holding tanks	Month	12	38611.00	R 463,332.00
M35-29		Main sludge transfer pump station	Month	12	15445.00	R 185,340.00
M35-30		Dewatering building	Month	12	468355.00	R 5,620,260.00
M35-31		Sludge cake silos	Month	12	23167.00	R 278,004.00
		Carried forward / ...				R 22,964,595.79

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 22,964,595.79
M35-32		All other pump stations (scum pump station, WAS feed pumps, primary sludge feed pumps, RAS pump station, etc)	Month	12	72292.00	R 867,504.00
M35-33		Service water pump station	Month	12	38611.00	R 463,332.00
M35-34		TSE pump station	Month	1	38611.00	R 38,611.00
M35-35		Generator	Month	12	30889.00	R 370,668.00
M35-36		Associated MCC's and associated equipment	Month	12	98175.00	R 1,178,100.00
M35-37		Provisional Allowance for Spares and Consumables (supply and deliver)	Prov Sum	1	15 000 000	R 15,000,000.00
M35-38		Charge required by Contractor on above item	%	15 000 000		R 2,400,000.00
		Process control: assistance and Maintenance training of works personnel (including certification)				
		Training of Works Personnel (Payment Item OMT3 as per Part C3.4.9.3.d)				
M35-39		Development of a Syllabus for training of operators and process controllers	Sum	1	176550.00	R 176,550.00
M35-40		Presenting a training course for operators and process controllers	Sum	1	1770764.04	R 1,770,764.04
M35-41		Presenting a training course for maintenance personnel (mechanical and electrical)	Sum	1	171050.00	R 171,050.00
M35-42		Arranging demonstration session(s) for trainees (monthly)	Sum	1	189750.00	R 189,750.00
M35-43		Configuring SCADA based maintenance schedules, logging and integration of maintenance schedules into the asset management system	Sum	1	1862198.87	R 1,862,198.87
M35-44		Monthly data analytics for preventative maintenance	Sum	1	577500.00	R 577,500.00
M35-45		Monthly data analytics for plant optimisation	Sum	1	298320.00	R 298,320.00
M35-46		Provisional allowance as directed by the Engineer	Prov	1	2 000 000	R 2,000,000.00
		Carried forward / ...				R 50,328,943.70

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 50,328,943.70
M35-47		Charge required by Contractor on above item 46	%	2 000 000		R 320,000.00
M35-48		Other general expenses incurred in complying with the requirements of the Scope of Work not included above (specify): **.....** **.....** **.....** **.....** **.....**	Item	-		
TOTAL OF BILL M35 CARRIED TO SUMMARY						**R 50,648,943.70**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		BILL M36				
		MAINTENANCE INSPECTIONS (PART TIME)				
		Allow for all costs and expenses in connection with the following items:				
		Preliminary and General				
		Preliminary and General Costs (Payment Item MI1 as per Part C3.4.9.3.d):				
M36-1		Providing insurances for Maintenance for a total period of 6 months	Sum	1	322713.82	R 322,713.82
		Health and Safety:				
M36-2		General obligations in compliance with the Occupational Health & Safety Act, Construction Regulations 2014 and the Occupational Health and Safety Specification for a total period of six months after the defects notification period	Month	6	46069.00	R 276,414.00
M36-3		Other general expenses incurred in complying with the requirements of the Scope of Work no included above (specify): **……..** **……..** **……..**	Item	-		
		Maintenance inspections for specific works for a total period of 6 months after defects notification period				
		Weekly Maintenance Inspections of the following Works for a total period of 2 months (Payment Item MI2 as per Part C3.4.9.3.d)				
M36-4		Inlet Works: Screw pumps, Screening and degritting	Month	2	23167.00	R 46,334.00
M36-5		Emergency tank	Month	2	4634.00	R 9,268.00
M36-6		PSTs	Month	2	17107.20	R 34,214.40
M36-7		Biological Reactor	Month	2	17107.20	R 34,214.40
M36-8		Blower Building	Month	2	17107.20	R 34,214.40
		Carried forward / ...				R 757,373.02

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 757,373.02
M36-9		SSTs	Month	2	17107.20	R 34,214.40
M36-10		UV Units	Month	2	79147.20	R 158,294.40
M36-11		Chlorination	Month	2	4634.00	R 9,268.00
M36-12		Primary sludge screening facility	Month	2		
M36-13		Gravity thickeners	Month	2	17107.20	R 34,214.40
M36-14		Anaerobic digesters	Month	2	17107.20	R 34,214.40
M36-15		Gas holding tanks	Month	2		INCL IN M36.16
M36-16		CHP facility	Month	2	202339.04	R 404,678.08
M36-17		WAS holding tanks	Month	2	7723.00	R 15,446.00
M36-18		Primary sludge holding tanks	Month	2	7723.00	R 15,446.00
M36-19		Main sludge transfer pump station	Month	2	20196.20	R 40,392.40
M36-20		Dewatering building	Month	2	97784.00	R 195,568.00
M36-21		Sludge cake silos	Month	2	3089.00	R 6,178.00
M36-22		All other pump stations (scum pump station, WAS feed pumps, primary sludge feed pumps, RAS pump station, etc)	Month	2	12949.80	R 25,899.60
M36-23		Washwater pump station	Month	2	7723.00	R 15,446.00
M36-24		TSE pump station	Month	2	7723.00	R 15,446.00
M36-25		Generator	Month	2	6178.00	R 12,356.00
M36-26		Generator set and associated MCC's and associated equipment	Month	2	54400.00	R 108,800.00
M36-27		Updating SCADA based maintenance logs, analysing predictive analysis from data and updating maintenance logs based on analytics results	Month	2	127345.00	R 254,690.00
		Bi weekly Maintenance Inspections of the following Works for a total period of 2 months (Payment Item MI2 as per Part C3.4.9.3.d)				
M36-28		Inlet Works: Screw pumps, Screening and degritting	Month	2	11584.00	R 23,168.00
M36-29		Emergency tank	Month	2	2317.00	R 4,634.00
M36-30		PSTs	Month	2	8553.60	R 17,107.20
		Carried forward / ...				R 2,182,833.90

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 2,182,833.90
M36-31		Biological Reactor	Month	2	8553.60	R 17,107.20
M36-32		Blower Building	Month	2	8553.60	R 17,107.20
M36-33		SSTs	Month	2	8553.60	R 17,107.20
M36-34		UV Units	Month	2	8553.60	R 17,107.20
M36-35		Chlorination	Month	2	2317.00	R 4,634.00
M36-36		Primary sludge screening facility	Month	2	3089.00	R 6,178.00
M36-37		Gravity thickeners	Month	2	8553.60	R 17,107.20
M36-38		Anaerobic digesters	Month	2		INCL IN M36.40
M36-39		Gas holding tanks	Month	2		INCL IN M36.40
M36-40		CHP facility	Month	2	139469.40	R 278,938.80
M36-41		WAS holding tanks	Month	2	3862.00	R 7,724.00
M36-42		Primary sludge holding tanks	Month	2	1545.00	R 3,090.00
M36-43		Main sludge transfer pump station	Month	2	47164.60	R 94,329.20
M36-44		Dewatering building	Month	2	24424.00	R 48,848.00
M36-45		Sludge cake silos	Month	2	1545.00	R 3,090.00
M36-46		All other pump stations (scum pump station, WAS feed pumps, primary sludge feed pumps, RAS pump station, etc)	Month	2	7247.40	R 14,494.80
M36-47		Washwater pump station	Month	2	3089.00	R 6,178.00
M36-48		TSE pump station	Month	2	3089.00	R 6,178.00
M36-49		Generator	Month	2	1545.00	R 3,090.00
M36-50		Generator set and associated MCC's and associated equipment	Month	2	81600.00	R 163,200.00
M36-51		Updating SCADA based maintenance logs, analysing predictive analysis from data and updating maintenance logs based on analytics results	Month	2	157605.00	R 315,210.00
		Monthly Maintenance Inspections of the following Works for a total period of 2 months (Payment Item MI2 as per Part C3.4.9.3.d)				
M36-52		Inlet Works: Screw pumps, Screening and degritting	Month	2	5792.00	R 11,584.00
		Carried forward / ...				R 3,235,136.70

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 3,235,136.70
M36-53		Emergency tank	Month	2	1159.00	R 2,318.00
M36-54		PSTs	Month	2	4276.80	R 8,553.60
M36-55		Biological Reactor	Month	2	4276.80	R 8,553.60
M36-56		Blower Building	Month	2	4276.80	R 8,553.60
M36-57		SSTs	Month	2	4276.80	R 8,553.60
M36-58		UV Units	Month	2	4276.80	R 8,553.60
M36-59		Chlorination	Month	2	1159.00	R 2,318.00
M36-60		Primary sludge screening facility	Month	2	1545.00	R 3,090.00
M36-61		Gravity thickeners	Month	2	4276.80	R 8,553.60
M36-62		Anaerobic digesters	Month	2		INCL IN M36.64
M36-63		Gas holding tanks	Month	2		INCL IN M36.64
M36-64		CHP facility	Month	2	110851.57	R 221,703.14
M36-65		WAS holding tanks	Month	2	1931.00	R 3,862.00
M36-66		Primary sludge holding tanks	Month	2	773.00	R 1,546.00
M36-67		Main sludge transfer pump station	Month	2	23582.80	R 47,165.60
M36-68		Dewatering building	Month	2	22494.00	R 44,988.00
M36-69		Sludge cake silos	Month	2	773.00	R 1,546.00
M36-70		All other pump stations (scum pump station, WAS feed pumps, primary sludge feed pumps, RAS pump station, etc)	Month	2	3624.20	R 7,248.40
M36-71		Washwater pump station	Month	2	1545.00	R 3,090.00
M36-72		TSE pump station	Month	2	1545.00	R 3,090.00
M36-73		Generator	Month	2	773.00	R 1,546.00
M36-74		Generator set and associated MCC's and associated equipment	Month	2	54400.00	R 108,800.00
M36-75		Updating SCADA based maintenance logs, analysing predictive analysis from data and updating maintenance logs based on analytics results	Month	2	127345.00	R 254,690.00
M36-76		Call-out charge in response to a breakdown (payment item MI3 as per Part C3.4.9.3.d)	No	36	8483.50	R 305,406.00
		Carried forward / ...				R 4,298,865.44

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 4,298,865.44
M36-77		Charge for actual repair work done in response to a breakdown (payment item MI4 as per Part C3.4.9.3.d)	Hours	250	2026.88	R 506,720.00
M36-78		Other general expenses incurred in complying with the requirements of the Scope of Work no included above (specify): **.....** **.....** **.....** **.....** **.....**	Item	-		
TOTAL OF BILL M36 CARRIED TO SUMMARY						**R 4,805,585.44**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3B Section B1	**BILL E1**				
	5	**SUPPLY AND LOCAL AUTHORITY LIASON**				
E1-1		General Eskom liaison	Sum	1	178600.00	R 178,600.00
E1-2		NERSA liaison and cogeneration license application/registration	Sum	1	1965681.00	R 1,965,681.00
E1-3		City of Cape Town liaison and SSEG registration	Sum	1	155100.00	R 155,100.00
E1-4	6, 12	**City of Cape Town EAM / MV department liaison and interaction for switching and implementation; risk assessments; method statements; wayleave applications, and obtaining working permits**	Sum	1	29375.00	R 29,375.00
E1-5	6.4	**Switching by Contractor's responsible person in absence of Employer MV personnel**	Sum	1	38070.00	R 38,070.00
E1-6		CoCT civil departments wayleave application for MV cable installation	Sum	1	174488.00	R 174,488.00
E1-7		Western Cape Provisional government dept wayleave application for access road up to plant	Sum	1	116325.00	R 116,325.00
E1-8	5.3	**Load flow and Power Quality logging and analysis**	Sum	1	302528.00	R 302,528.00
E1-9	5.3.3	**Eskom Self-Build design and documents, and proof of compliance**	Sum	1	723272.00	R 723,272.00
		Provisional Sums				
E1-10		Additional requirements / costs related to cogeneration requirements, including potential PV options	Prov Sum	1	175 000	R 175,000.00
E1-11		Overheads, charges and profit on item above	%	175 000		R 28,000.00
		Other:-				
E1-12		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify)	Item	-		
TOTAL OF BILL E1 CARRIED TO SUMMARY						**R 3,886,439.00**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3B Section B1	**BILL E2**				
	7	**PRIMARY MV SWITCHGEAR**				
		Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:				
		Eskom Paardevlei Substation				
E2-1		Actom AMV12 switchboard panels	No	2	588799.00	R 1,177,598.00
E2-2		Off-board protection equipment and systems, including fibre optic cable	Sum	1	497122.00	R 497,122.00
		Eskom Annenprop Substation				
E2-3		Actom AMV12 switchboard panel	No	1	625429.00	R 625,429.00
E2-4		Off-board protection equipment and systems, including fibre optic cable	Sum	1	248561.00	R 248,561.00
		Macassar WWTW - Eskom Incoming Switching Station				
E2-5		Protection schemes and protection coordination report for upgrade to Eskom supply sub-stations and new switching station	Sum	1	138650.00	R 138,650.00
E2-6		Macassar WWTW - Eskom Incoming Switchboard	Sum	1	7238923.00	R 7,238,923.00
E2-7	9	**Battery Tripping Unit**	No	1	798548.00	R 798,548.00
E2-8		110VDC Distribution Board	No	1	88125.00	R 88,125.00
E2-9		Sub-station automation: hardware, cabling, engineering and commissioning	Sum	1	434276.00	R 434,276.00
E2-10		Protection scheme to Eskom supply sub-stations: RED 615 protection system, including fibre patch panel and lead	No	3	262699.00	R 788,097.00
E2-11		Metering	Sum	1	74152.00	R 74,152.00
E2-12		Circuit breaker trolleys	No	2	55067.00	R 110,134.00
E2-13		Padlocks	Sum	1	4054.00	R 4,054.00
		Carried forward / ...				R 12,223,669.00

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 12,223,669.00
E2-14		Sump pump, complete with power supply, switch-disconnector and piping	Sum	1	58750.00	R 58,750.00
E2-15		32mm high open GRP trench covers for Eskom Incoming switching station room, complete with all mounting accessories	Sum	1	98020.00	R 98,020.00
		Macassar WWTW Main Incomers				
E2-16		Protection settings study, report and configuration by specialist	Sum	1	82250.00	R 82,250.00
E2-17		Macassar WWTW Main Incomers switchboard	No	2	4388068.00	R 8,776,136.00
E2-18		Sub-station automation: hardware, cabling, engineering and commissioning	Sum	1	434276.00	R 434,276.00
E2-19		Digital Power meter	No	2	46462.00	R 92,924.00
E2-20		32mm high open GRP trench covers for Isolation Transformer feeder room and metering room, complete with all mounting accessories	Sum	1	117198.00	R 117,198.00
		Macassar WWTW Main Intake Switchboard				
E2-21		Protection settings study, report and configuration by specialist	Sum	1	165675.00	R 165,675.00
E2-22		Macassar WWTW Main Intake Switchboard	Sum	1	18561392.00	R 18,561,392.00
E2-23		Battery Tripping Unit	No	2	798548.00	R 1,597,096.00
E2-24	9	**110VDC Distribution Board**	No	2	88125.00	R 176,250.00
E2-25	14	**NER / NEC / Aux transformer (NERCT) combination**	No	2	522999.00	R 1,045,998.00
E2-26		NER / NEC / Aux transformer (NERCT) pre-cast plinth	No	2	17625.00	R 35,250.00
E2-27		Sub-station automation: hardware, cabling, engineering and commissioning	Sum	1	1477101.00	R 1,477,101.00
E2-28		Digital Power meter	No	6	46462.00	R 278,772.00
E2-29		Quality of Supply power meter	No	2	151405.00	R 302,810.00
		Carried forward / ...				R 45,523,567.00

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 45,523,567.00
E2-30		Quality of Supply power meter sim and data subscription plus reporting of data	Month	48	647.00	R 31,056.00
E2-31		Protection scheme to Eskom supply sub-station: RED 615 protection system, including fibre patch panel and lead	No	2	442869.00	R 885,738.00
E2-32		Extra over, for VAMP arc protection scheme, including master and slave units, cabling and commissioning	Sum	1	380700.00	R 380,700.00
E2-33		Circuit breaker trolleys	No	4	5993.00	R 23,972.00
E2-34		Sump pump, complete with power supply, switch-disconnector and piping	Sum	1	58750.00	R 58,750.00
E2-35		32mm high open GRP trench covers for Main Intake Switchboard room, NECRT rooms and Auxiliary Transformer room, complete with all mounting accessories	Sum	1	53272.00	R 53,272.00
		Diesel Generators Collector Switchboard				
E2-36		Diesel Generator Collector Switchboard	Sum	1	11805123.00	R 11,805,123.00
E2-37	9	**Battery Tripping Unit**	No	1	798548.00	R 798,548.00
E2-38		110VDC Distribution Board	No	1	88125.00	R 88,125.00
E2-39		Sub-station automation: hardware, cabling, engineering and commissioning	Sum	1	600522.00	R 600,522.00
E2-40		Circuit breaker trolleys	No	2	5993.00	R 11,986.00
E2-41		32mm high open GRP trench covers for Diesel Generators Collector switchgear room, complete with all mounting accessories	Sum	1	187516.00	R 187,516.00
		Biogas Generators and Renewables Collector Switchboard				
E2-42		Biogas Generators and Renewables Collector Switchboard	Sum	1	11418251.00	R 11,418,251.00
E2-43	9	**Battery Tripping Unit**	No	1	798548.00	R 798,548.00
E2-44		110VDC Distribution Board	No	1	88125.00	R 88,125.00
E2-45		Sub-station automation: hardware, cabling, engineering and commissioning	Sum	1	431322.00	R 431,322.00
		Carried forward / ...				R 73,185,121.00

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 73,185,121.00
E2-46		Circuit breaker trolleys	No	2	5993.00	R 11,986.00
E2-47		32mm high open GRP trench covers for Bioga Generators Collector switchgear room, complete with all mounting accessories	Sum	1	115067.00	R 115,067.00
		Allow for all costs and expenses in connection with the Site installation of the following:-				
E2-48		All materials and equipment summarized in BILL E2 complete	Sum	1	4384113.00	R 4,384,113.00
		Provisional Sums				
E2-49		Additional MV infrastructure for Eskom switchgear and protection as required during Eskom self-build design	Prov Sum	1		R 175,000.00
E2-50		Percentage adjustment on above item for Contractor's overheads and profit	%	175 000		R 28,000.00
E2-51		Additional MV infrastructure for upgrading to Eskom most recent Grid Access code and design standards	Prov Sum	1	175 000	R 175,000.00
E2-52		Percentage adjustment on above item for Contractor's overheads and profit	%	175 000		R 28,000.00
E2-53		Additional relay and protection equipment to optimise arc and protection system	Prov Sum	1	175 000	R 175,000.00
E2-54		Percentage adjustment on above item for Contractor's overheads and profit	%	175 000		R 28,000.00
E2-55		Additional MV infrastructure for upgrading to CoCT MV department most recent design standards	Prov Sum	1	175 000	R 175,000.00
E2-56		Percentage adjustment on above item for Contractor's overheads and profit	%	175 000		R 28,000.00
		Other:-				
E2-57		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify)	Item	-		
TOTAL OF BILL E2 CARRIED TO SUMMARY						**R 78,508,287.00**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3B Section B1	**BILL E3**				
	8	**SECONDARY MV SWITCHGEAR**				
		Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:				
		Secondary Switchgear				
E3-1		Protection settings study, report and configuration by specialist	Sum	1	151575.00	R 151,575.00
E3-2		4-way 12kV CCFF switchboard complete	No	2	826190.00	R 1,652,380.00
E3-3		4-way 12kV CCVV switchboard complete	No	4	824869.00	R 3,299,476.00
E3-4		Battery Tripping Unit	No	4	102731.00	R 410,924.00
E3-5		Sub-station automation: hardware, cabling, engineering and commissioning	No	6	154455.00	R 926,730.00
E3-6		Padlocks	Sum	1	2538.00	R 2,538.00
E3-7		32mm high open GRP trench covers for secondary switchgear room, complete with all mounting accessories	No	6	53272.00	R 319,632.00
		Allow for all costs and expenses in connection with the Site installation of the following:-				
E3-8		All materials and equipment summarized in BILL E3 complete	Sum	1	1009147.00	R 1,009,147.00
		Other:-				
E3-9		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **……..** **……..** **……..** **……..** **……..**	Item	-		
TOTAL OF BILL E3 CARRIED TO SUMMARY						**R 7,772,402.00**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3B Section B1	**BILL E4**				
	10	**DISTRIBUTION TRANSFORMERS**				
		Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:				
		Distribution Transformers				
E4-1		0.8 MVA 11.5 / 0.42 kV transformer	No	1	775841.00	Rate Only
E4-2		1.0 MVA 11.5 / 0.42 kV transformer	No	2	832052.00	R 1,664,104.00
E4-3		1.25 MVA 11.5 / 0.42 kV transformer	No	1	958577.00	Rate Only
E4-4		1.6 MVA 11.5 / 0.42 kV transformer	No	4	1052577.00	R 4,210,308.00
E4-5		2.0 MVA 11.5 / 0.42 kV transformer	No	1	1200392.00	Rate Only
E4-6		2.5 MVA 11.5 / 0.42 kV transformer	No	1	1339371.00	Rate Only
E4-7		2.0 MVA 11.5 / 0.42 kV transformer (including NER)	No	2	1198042.00	R 2,396,084.00
E4-8		2.5 MVA 11.5 / 0.42 kV transformer (including NER)	No	4	1324096.00	R 5,296,384.00
E4-9		32mm high open GRP trench covers for transformer rooms, complete with all mounting accessories	No	12	31963.00	R 383,556.00
		Step-up Transformers				
E4-10		2.0 MVA 0.4 / 11.5 kV transformer	No	9	1154437.00	R 10,389,933.00
E4-11		Cast Resin encapsulated, overhead mounted busbar trunking, from engine alternator to transformer LV terminals, including all mounting accessories, bends, terminations, complete.	No	9	429878.00	R 3,868,902.00
E4-12		8-way 12kV earthing switchboard complete	Sum	1	864877.00	R 864,877.00
E4-13		6-way 12kV earthing switchboard complete	Sum	1	865519.00	R 865,519.00
E4-14		Neutral Earth Resistors (NER)	No	2	453304.00	R 906,608.00
		Carried forward / ...				R 30,846,275.00

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 30,846,275.00
E4-15		32mm high open GRP trench covers for earthing switchboard switchgear room, complete with all mounting accessories	No	2	10655.00	R 21,310.00
E4-16		Foundation earthing and earth cabling for centralised earthing system	Sum	1		
E4-17		Padlocks	Sum	1	2538.00	R 2,538.00
		Auxiliary Transformer				
E4-18		0.315 MVA 11.5 / 0.42 kV transformer	No	1	536047.00	R 536,047.00
E4-19		0.315 MVA 11.5 / 0.42 kV mini-sub, with CCF RMU and plinth complete	No	1	1029312.00	Rate Only
		Allow for all costs and expenses in connection with the Site installation of the following:-				
E4-20		All materials and equipment summarized in BILL E4 complete	Sum	1	558360.00	R 558,360.00
		Other:-				
E4-21		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **……..** **……..** **……..** **……..** **……..**	Item	-		
TOTAL OF BILL E4 CARRIED TO SUMMARY						**R 31,964,530.00**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3B Section B1	**BILL E5**				
	11	**ISOLATION TRANSFORMERS**				
		Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:				
E5-1		7.5 MVA 11.5 / 11.5 kV transformer	No	2	5304667.00	R 10,609,334.00
E5-2		Neutral Earth Resistors (NER)	No	2	522999.00	R 1,045,998.00
E5-3		Steel fire barrier between transformers, including concrete founding and footing	Sum	1	377682.00	R 377,682.00
		Allow for all costs and expenses in connection with the Site installation of the following:-				
E5-4		All materials and equipment summarized in BILL E5 complete	Sum	1	69795.00	R 69,795.00
		Other:-				
E5-5		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **……** **……** **……** **……** **……**	Item	-		
TOTAL OF BILL E5 CARRIED TO SUMMARY						**R 12,102,809.00**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3B Section B1	**BILL E6**				
	12	**MV CABLING**				
		Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:				
E6-1		300mm² Al XLPE insulated 3-core 6,35/11 kV screened conductor (Eskom Water block cable type)	m	16 000	1224.00	R 19,584,000.00
E6-2		300mm² Al XLPE 3-core terminations (Eskom water block cable type)	No	6	7614.00	R 45,684.00
E6-3		300mm² Al XLPE 3-core joints (Eskom water block cable type)	No	64	5838.00	R 373,632.00
E6-4		48-core Single Mode Fibre optic cable (Eskom spec)	m	8 000	28.00	R 224,000.00
E6-5		48-core Single Mode Fibre optic cable patch with enclosure complete	No	192	508.00	R 97,536.00
E6-6		Fibre optic cable - draw pit	No	24	6345.00	R 152,280.00
E6-7		300mm² Al PILC 3-core insulated 6,35/11 kV screened conductor	m	3 800	1293.00	R 4,913,400.00
E6-8		300mm² Al PILC 3-core terminations	No	36	7614.00	R 274,104.00
E6-9		300mm² Al PILC 3-core joints	No	12	5838.00	R 70,056.00
E6-10		300mm² Al PILC 3-core to 3x300mm² Al PILC 1-core trifurcating joint	No	36	9899.00	R 356,364.00
E6-11		300mm² Al PILC 1-core insulated 6,35/11 kV conductor	m	720	838.00	R 603,360.00
E6-12		300mm² Al PILC 1-core terminations	No	108	2729.00	R 294,732.00
E6-13		120mm² Al PILC 3-core insulated 6,35/11 kV screened conductor	m	100	838.00	R 83,800.00
E6-14		120mm² Al PILC 3-core terminations	No	1	7614.00	R 7,614.00
E6-15		120mm² Al PILC 3-core joints	No	1	5838.00	R 5,838.00
E6-16		50mm² Al PILC 3-core insulated 6,35/11 kV screened conductor	m	500	541.00	R 270,500.00
E6-17		50mm² Al PILC 3-core terminations	No	46	7614.00	R 350,244.00
		Carried forward / ...				R 27,707,144.00

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 27,707,144.00
E6-18		50mm² Al PILC 3-core joints	No	2	5076.00	R 10,152.00
E6-19		95mm² Cu PILC 3-core insulated 6,35/11 kV screened conductor	m	500	1368.00	R 684,000.00
E6-20		95mm² Cu PILC 3-core terminations	No	4	7614.00	R 30,456.00
E6-21		95mm² Cu PILC 3-core joints	No	6	5076.00	R 30,456.00
E6-22		70mm² bare copper earth conductor with stranded conductors	m	20 100	168.00	R 3,376,800.00
E6-23		70mm² bare copper earth conductor terminations	No	32	26.00	R 832.00
		Allow for all costs and expenses in connection with the Site installation of the following:-				
E6-24		All materials and equipment summarized in BILL E6 complete	Sum	1	2247603.00	R 2,247,603.00
E6-25		Excavation and backfill	m	20 400	112.00	R 2,284,800.00
E6-26		260mm deep bedding around cable	m	20 400	62.00	R 1,264,800.00
E6-27		300mm deep soil crete mixture for backfill	m	7 200	100.00	R 720,000.00
E6-28		Pipe drilling DN160 sleeve underneath road or river	m	1 250	1378.00	R 1,722,500.00
E6-29		Security during installation	Sum	1	498905.00	R 498,905.00
E6-30		Underground cable ancillaries (danger tape, 400mm wide, overlapping)	m	20 400	13.00	R 265,200.00
E6-31		Underground cable ancillaries (cement slabs)	m	5 100	215.00	R 1,096,500.00
E6-32		Cable markers (with engraved aluminium plate)	No	160	214.00	R 34,240.00
E6-33		Scanning / Radio detection survey of newly installed cables, mapping to GIS coordinates and MV cable and joint route layout with co-ordinates	Sum	1	190350.00	R 190,350.00
		Carried forward / ...				R 42,164,738.00

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 42,164,738.00
		Provisional Sums				
E6-34		Relocation and extension of MV cables, overhead lines and internal WWTW fibre ring during changeover to new substation and/or construction of civil structures	Prov Sum	1	175 000	R 175,000.00
E6-35		Percentage adjustment on above item for Contractor's overheads and profit	%	175 000		R 28,000.00
		Other:-				
E6-36		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **……** **……** **……** **……** **……**	Item	-		
TOTAL OF BILL E6 CARRIED TO SUMMARY						**R 42,367,738.00**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3B Section B1	**BILL E7**				
	15, 16, 17	**LV SWITCHGEAR AND CONTROL ASSEMBLIES** **Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:**				
E7-1	14.2	**Inlet Works MCC 92EI03-PNL01 complete.**	Sum	1	9727759.76	R 9,727,759.76
E7-2	14.2	**Bioreactor MCC 92EI04-PNL01 complete.**	Sum	1	17938251.00	R 17,938,251.00
E7-3	14.2	**Blower MCC 92EI02-PNL01 complete.**	Sum	1	7878829.38	R 7,878,829.38
E7-4	14.2	**Dewatering MCC 92EI01-PNL01 complete.**	Sum	1	26207795.42	R 26,207,795.42
E7-5	14.2	**Service Water MCC 92EI06-PNL01 complete.**	Sum	1	6225873.52	R 6,225,873.52
E7-6	14.2	**Ultraviolet MCC 92EI02-PNL01 complete.**	Sum	1	4076127.24	R 4,076,127.24
E7-7	14.2	**Primary Settling Tank MCC 92EI03-PNL02 complete.**	Sum	1	3735895.15	R 3,735,895.15
E7-8	14.2	**Secondary Settling Tank MCC 92EI02-PNL02 complete.**	Sum	1	2009970.28	R 2,009,970.28
E7-9	14.2	**Primary Sludge 1 MCC 92EI01-PNL09 complete.**	Sum	1	1212998.07	R 1,212,998.07
E7-10	14.2	**Primary Sludge 2 MCC 92EI01-PNL10 complete.**	Sum	1	1212998.07	R 1,212,998.07
E7-11	14.2	**Primary Sludge 3 MCC 92EI01-PNL11 complete.**	Sum	1	1212998.07	R 1,212,998.07
E7-12	14.2	**Waste Activated Sludge 1 MCC 92EI01-PNL02 complete.**	Sum	1	864244.21	R 864,244.21
E7-13	14.2	**Waste Activated Sludge 2 MCC 92EI01-PNL03 complete.**	Sum	1	864244.21	R 864,244.21
E7-14	14.2	**Waste Activated Sludge 3 MCC 92EI01-PNL04 complete.**	Sum	1	864244.21	R 864,244.21
		Carried forward / ...				R 84,032,228.60

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 84,032,228.60
E7-15	14.2	**Waste Activated Sludge 4 MCC 92EI01-PNL05 complete.**	Sum	1	864244.21	R 864,244.21
E7-16	14.2	**Waste Activated Sludge 5 MCC 92EI01-PNL06 complete.**	Sum	1	864244.21	R 864,244.21
E7-17	14.2	**Waste Activated Sludge 6 MCC 92EI01-PNL07 complete.**	Sum	1	864244.21	R 864,244.21
E7-18	14.2	**Waste Activated Sludge 7 MCC 92EI01-PNL08 complete.**	Sum	1	864244.21	R 864,244.21
E7-19	14.2	**TSE MCC 92EI06-PNL02 complete.**	Sum	1	4150241.77	R 4,150,241.77
E7-20	15.6	**Motor Field Control Stations**	No	380	3500.00	R 1,330,000.00
E7-21		Bioreactor MCC 92EI04-PNL01 resin encapsulated copper incomer busbars from 97VX06-TRF01& 97VX06-TRF02 including all associated costs	m	160	33456.25	R 5,353,000.64
E7-22		Blower MCC 92EI02-PNL01 resin encapsulated copper incomer busbars from 97VX07-TRF01 & 97VX07-TRF02 including all associated costs	m	70	35625.43	R 2,493,780.38
E7-23		Dewatering MCC 92EI01-PNL01 resin encapsulated copper incomer busbars from 97VX03-TRF01 & 97VX03-TRF02 including all associated costs	m	70	35625.43	R 2,493,780.38
E7-24	16	**Inlet Works MCC 92EI03-PNL01 Power factor correction.**	No	2	164384.91	R 328,769.82
E7-25	16	**Bioreactor MCC 92EI04-PNL01 Power factor correction**	No	2	351796.50	R 703,593.00
E7-26	16	**Blower MCC 92EI02-PNL01 Power Factor correction**	No	2	319815.00	R 639,630.00
E7-27	16	**Dewatering MCC 92EI01-PNL01 Power factor Correction**	No	2	460533.60	R 921,067.20
E7-28	16	**Service Water MCC 92EI06-PNL01 Power factor correction**	No	2	287833.50	R 575,667.00
E7-29	16	**Ultraviolet MCC 92EI02-PNL01 Power factor correction**	No	2	150952.68	R 301,905.36
E7-30		Dewatering MCC 92EI01-PNL01 Static Harmonic Filter	No	2	294229.80	R 588,459.60
		Carried forward / ...				R 107,369,100.59

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 107,369,100.59
E7-31		Service Water MCC 92EI06-PNL01 Static Harmonic Filter	No	2	147114.90	R 294,229.80
E7-32		Cast resin encapsulated copper busbars 3000 A	m	1	34031.20	Rate Only
E7-33		Cast resin encapsulated copper busbars 3500A	m	1	37734.26	Rate Only
E7-34		Cast resin encapsulated copper busbars 4000A	m	1	40211.61	Rate Only
E7-35		Air circuit breaker 2500 A	No	1	144163.95	Rate Only
E7-36		Air circuit breaker 3200A	No	1	167110.50	Rate Only
E7-37		Air circuit breaker 4000A	No	1	217185.39	Rate Only
E7-38		Air circuit breaker 5000A	No	1	361050.84	Rate Only
E7-39		GRP grid 38 mm high, 850 mm wide trench covers for Inlet Works Electrical building complete with all mounting accessories	Sum	1	135272.48	R 135,272.48
E7-40		GRP grid 38 mm high, 850 mm wide trench covers for PST Electrical Building complete with all mounting accessories	Sum	1	37876.29	R 37,876.29
E7-41		GRP grid 38 mm high, 850 mm wide trench covers for Bioreactor Electrical Building complete with all mounting accessories	Sum	1	146094.27	R 146,094.27
E7-42		GRP grid 38 mm high, 850 mm wide trench covers for Ultraviolet Electrical Building complete with all mounting accessories	Sum	1	156916.07	R 156,916.07
E7-43		GRP grid 38 mm high, 850 mm wide trench covers for Service Water Electrical Building complete with all mounting accessories	Sum	1	86574.38	R 86,574.38
E7-44		GRP grid 38 mm high, 850 mm wide trench covers for Blower Electrical Building and Blower room complete with all mounting accessories	Sum	1	324653.94	R 324,653.94
E7-45		GRP grid 38 mm high, 850 mm wide trench covers for Dewatering electrical room complete with all mounting accessories	Sum	1	37876.29	R 37,876.29
E7-46		GRP grid 38 mm high, 850 mm wide trench covers for TSE and Filter Building complete with all mounting accessories	Sum	1	113657.00	R 113,657.00
		Carried forward / ...				R 108,702,251.12

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 108,702,251.12
		Allow for all costs and expenses in connection with the Site installation of the following:-				
E7-47		Inlet Works MCC 92EI03-PNL01 complete.	Sum	1	180590.42	R 180,590.42
E7-48		Bioreactor MCC 92EI04-PNL01 complete.	Sum	1	271335.99	R 271,335.99
E7-49		Blower MCC 92EI02-PNL01 complete.	Sum	1	129100.72	R 129,100.72
E7-50		Dewatering MCC 92EI01-PNL01 complete.	Sum	1	374289.64	R 374,289.64
E7-51		Service Water MCC 92EI06-PNL01 complete.	Sum	1	80337.94	R 80,337.94
E7-52		Ultraviolet MCC 92EI02-PNL01 complete.	Sum	1	61965.32	R 61,965.32
E7-53		Primary Settling Tank MCC 92EI03-PNL02 complete.	Sum	1	69790.74	R 69,790.74
E7-54		Secondary Settling Tank MCC 92EI02-PNL02 complete.	Sum	1	80780.84	R 80,780.84
E7-55		Primary Sludge 1 MCC 92EI01-PNL09 complete.	Sum	1	33359.64	R 33,359.64
E7-56		Primary Sludge 2 MCC 92EI01-PNL10 complete.	Sum	1	33359.64	R 33,359.64
E7-57		Primary Sludge 3 MCC 92EI01-PNL11 complete.	Sum	1	33359.64	R 33,359.64
E7-58		Waste Activated Sludge 1 MCC 92EI01-PNL02 complete.	Sum	1	33359.64	R 33,359.64
E7-59		Waste Activated Sludge 2 MCC 92EI01-PNL03 complete.	Sum	1	33359.64	R 33,359.64
E7-60		Waste Activated Sludge 3 MCC 92EI01-PNL04 complete.	Sum	1	33359.64	R 33,359.64
E7-61		Waste Activated Sludge 4 MCC 92EI01-PNL05 complete.	Sum	1	33359.64	R 33,359.64
E7-62		Waste Activated Sludge 5 MCC 92EI01-PNL06 complete.	Sum	1	33359.64	R 33,359.64
E7-63		Waste Activated Sludge 6 MCC 92EI01-PNL07 complete.	Sum	1	33359.64	R 33,359.64
E7-64		Waste Activated Sludge 7 MCC 92EI01-PNL08 complete.	Sum	1	33359.64	R 33,359.64
E7-65		TSE MCC 92EI06-PNL02 complete.	Sum	1	77417.89	R 77,417.89
		Carried forward / ...				R 110,361,457.01

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 110,361,457.01
E7-66		Motor Field Control Stations	Sum	380	477.23	R 181,348.67
E7-67		Bioreactor MCC 92EI04-PNL01 resin encapsulated copper incomer busbars from 97VX06-TRF01 & 97VX06-TRF02 including all associated costs	Sum	160	2987.00	R 477,920.00
E7-68		Blower MCC 92EI02-PNL01 resin encapsulated copper incomer busbars from 97VX07-TRF01 & 97VX07-TRF02 including all associated costs	Sum	70	2987.00	R 209,090.00
E7-69		Dewatering MCC 92EI01-PNL01 resin encapsulated copper incomer busbars from 97VX03-TRF01 & 97VX03-TRF02 including all associated costs	Sum	70	2987.00	R 209,090.00
E7-70		Inlet Works MCC 92EI03-PNL01 Power factor correction.	No	2	19853.25	R 39,706.50
E7-71		Bioreactor MCC 92EI04-PNL01 Power factor correction	No	2	42487.50	R 84,975.00
E7-72		Blower MCC 92EI02-PNL01 Power Factor correction	No	2	38625.00	R 77,250.00
E7-73		Dewatering MCC 92EI01-PNL01 Power factor Correction	No	2	55620.00	R 111,240.00
E7-74		Service Water MCC 92EI06-PNL01 Power factor correction	No	2	34762.50	R 69,525.00
E7-75		Ultraviolet MCC 92EI02-PNL01 Power factor correction	No	2	18231.00	R 36,462.00
E7-76		Dewatering MCC 92EI01-PNL01 Static Harmonic Filter	No	2	35535.00	R 71,070.00
E7-77		Service Water MCC 92EI06-PNL01 Static Harmonic Filter	No	2	17767.50	R 35,535.00
E7-78		Cast resin encapsulated copper busbars 3000 A	m	1	3285.70	Rate Only
E7-79		Cast resin encapsulated copper busbars 3500A	m	1	3285.70	Rate Only
E7-80		Cast resin encapsulated copper busbars 4000A	m	1	3285.70	Rate Only
E7-81		Air circuit breaker 2500 A	No	1	11327.17	Rate Only
E7-82		Air circuit breaker 3200A	No	1	13130.11	Rate Only
E7-83		Air circuit breaker 4000A	No	1	17064.57	Rate Only
		Carried forward / ...				R 111,964,669.17

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 111,964,669.17
E7-84		Air circuit breaker 5000A	No	1	28368.28	Rate Only
E7-85		GRP grid 38 mm high, 850 mm wide trench covers for Inlet Works Electrical building complete with all mounting accessories	Sum	1	21117.58	R 21,117.58
E7-86		GRP grid 38 mm high, 850 mm wide trench covers for PST Electrical Building complete with all mounting accessories	Sum	1	5368.88	R 5,368.88
E7-87		GRP grid 38 mm high, 850 mm wide trench covers for Bioreactor Electrical Building complete with all mounting accessories	Sum	1	23265.13	R 23,265.13
E7-88		GRP grid 38 mm high, 850 mm wide trench covers for Ultraviolet Electrical Building complete with all mounting accessories	Sum	1	24696.83	R 24,696.83
E7-89		GRP grid 38 mm high, 850 mm wide trench covers for Service Water Electrical Building complete with all mounting accessories	Sum	1	13959.08	R 13,959.08
E7-90		GRP grid 38 mm high, 850 mm wide trench covers for Blower Electrical Building and Blower room complete with all mounting accessories	Sum	1	52257.05	R 52,257.05
E7-91		GRP grid 38 mm high, 850 mm wide trench covers for Dewatering electrical room complete with all mounting accessories	Sum	1	5368.88	R 5,368.88
E7-92		GRP grid 38 mm high, 850 mm wide trench covers for TSE and Filter Building complete with all mounting accessories	Sum	1	17538.33	R 17,538.33
E7-93		Switchgear changes as directed by the Engineer brought on by process design changes	Prov Sum	1	175 000	R 175,000.00
E7-94		Percentage adjustment on above item for Contractor's overheads and profit	%	175 000		R 28,000.00
		Other:-				
E7-95		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify)	Item	-		
		Switch Fieldbus 2 Channel Prox Input	**Item**	**1**	4751.66	Rate only
		2-ch smart 4-20mA Input Barrier	Item	1	7252.54	Rate only
		2-ch smart 4-20mA output + LFD	Item	1	10503.68	Rate only
		.....				
		.....				
TOTAL OF BILL E7 CARRIED TO SUMMARY						**R 112,331,240.90**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3B Section B1	**BILL E8**				
	23	**LV CABLES**				
		Allow for all costs and expenses in connection with the supply, delivery, offloading and storage of the following:				
		Cu/PVC Insulated/PVC Bedded/SWA/PVC Sheathed 600/1000V multicore cable with stranded conductors.				
E8-1		1.5mm² x 3 core	m	1	39.51	Rate Only
E8-2		2.5mm² x 3 core	m	72 680	41.10	R 2,987,184.49
E8-3		1.5mm² x 4 core	m	1	39.61	Rate Only
E8-4		2.5mm² x 4 core	m	60 550	50.35	R 3,048,617.96
E8-5		4mm² x 4 core	m	16 510	75.87	R 1,252,610.40
E8-6		6mm² x 4 core	m	18 670	102.03	R 1,904,933.71
E8-7		10mm² x 4 core	m	2 120	151.01	R 320,134.98
E8-8		16mm² x 4 core	m	4 000	219.76	R 879,043.20
E8-9		25mm² x 4 core	m	15 195	336.84	R 5,118,219.22
E8-10		35mm² x 4 core	m	18 560	470.85	R 8,738,987.04
E8-11		50mm² x 4 core	m	3 590	631.92	R 2,268,581.84
E8-12		70mm² x 4 core	m	7 540	877.80	R 6,618,615.81
E8-13		95mm² x 4 core	m	6 100	1186.97	R 7,240,516.63
E8-14		120mm² x 4 core	m	6 140	1476.52	R 9,065,819.75
E8-15		150mm² x 4 core	m	680	1880.66	R 1,278,845.65
E8-16		185mm² x 4 core	m	1	2546.96	Rate Only
E8-17		240mm² x 4 core	m	1	3215.26	Rate Only
E8-18		300mm² x 4 core	m	1	4138.05	Rate Only
		Carried forward / ...				R 50,722,110.68

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 50,722,110.68
		Cable terminations for Cu/PVC Insulated/PVC Bedded/SWA/PVC Sheathed 600/1000V multicore cables, complete, including gland shroud, lugs, tag numbers, etc and connection.				
E8-19		1.5mm² x 3 core	No	1	180.83	Rate Only
E8-20		2.5mm² x 3 core	No	674	180.83	R 121,880.73
E8-21		1.5mm² x 4 core	No	1	180.83	Rate Only
E8-22		2.5mm² x 4 core	No	586	218.12	R 127,820.14
E8-23		4mm² x 4 core	No	100	218.12	R 21,812.31
E8-24		6mm² x 4 core	No	132	314.93	R 41,571.13
E8-25		10mm² x 4 core	No	26	314.93	R 8,188.25
E8-26		16mm² x 4 core	No	54	435.71	R 23,528.37
E8-27		25mm² x 4 core	No	134	435.71	R 58,385.22
E8-28		35mm² x 4 core	No	158	435.71	R 68,842.27
E8-29		50mm² x 4 core	No	46	730.69	R 33,611.85
E8-30		70mm² x 4 core	No	66	1247.28	R 82,320.38
E8-31		95mm² x 4 core	No	64	1247.28	R 79,825.82
E8-32		120mm² x 4 core	No	62	1247.28	R 77,331.27
E8-33		150mm² x 4 core	No	8	1875.14	R 15,001.08
E8-34		185mm² x 4 core	No	1	1875.14	Rate Only
E8-35		240mm² x 4 core	No	1	3000.22	Rate Only
E8-36		300mm² x 4 core	No	1	3000.22	Rate Only
		Cu/PVC Insulated/PVC Bedded/AWA/PVC Sheathed 600/1000V single core cable with stranded conductors. Cable fixed to cable tray, drawn into sleeves or laid into trenches.				
E8-37		95mm² x 1 core	m	1	342.11	Rate Only
E8-38		120mm² x 1 core	m	120	394.95	R 47,394.56
E8-39		150mm² x 1 core	m	3 360	486.50	R 1,634,624.78
		Carried forward / ...				R 53,164,248.85

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 53,164,248.85
E8-40		185mm² x 1 core	m	1	645.61	Rate Only
E8-41		240mm² x 1 core	m	1	850.44	Rate Only
E8-42		300mm² x 1 core	m	120	972.11	R 116,653.74
E8-43		400mm² x 1 core	m	1	1332.67	Rate Only
E8-44		500mm² x 1 core	m	1	1685.54	Rate Only
		Cable terminations for Cu/PVC Insulated/PVC Bedded/AWA/PVC Sheathed 600/1000V single core cables, complete, including gland shroud, lugs, tag numbers, etc and connection.				
E8-45		95mm² x 1 core	No	1	435.71	Rate Only
E8-46		120mm² x 1 core	No	16	435.71	R 6,971.37
E8-47		150mm² x 1 core	No	24	730.69	R 17,536.62
E8-48		185mm² x 1 core	No	1	730.69	Rate Only
E8-49		240mm² x 1 core	No	1	1247.28	Rate Only
E8-50		300mm² x 1 core	No	16	1247.28	R 19,956.46
E8-51		400mm² x 1 core	No	1	1247.28	Rate Only
E8-52		500mm² x 1 core	No	1	1875.14	Rate Only
		Bare Copper Earth cable with stranded conductors.				
E8-53		1.5mm²	m	1	5.08	Rate Only
E8-54		2.5mm²	m	33 810	7.57	R 256,073.53
E8-55		4mm²	m	2 150	12.71	R 27,336.67
E8-56		6mm²	m	6 430	15.04	R 96,727.45
E8-57		10mm²	m	120	26.10	R 3,131.59
E8-58		16mm²	m	1 155	41.01	R 47,365.32
E8-59		25mm²	m	840	66.91	R 56,203.82
E8-60		35mm²	m	1 840	90.78	R 167,039.14
E8-61		50mm²	m	1	135.11	Rate Only
E8-62		70mm²	m	480	183.13	R 87,904.32
		Carried forward / ...				R 54,067,148.88

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 54,067,148.88
E8-63		95mm²	m	280	243.44	R 68,162.47
E8-64		120mm²	m	120	309.56	R 37,147.42
E8-65		150mm²	m	30	431.67	R 12,950.19
E8-66		185mm²	m	1	579.96	Rate Only
E8-67		240mm²	m	1	754.16	Rate Only
E8-68		300mm²	m	1	981.98	Rate Only
		Cable terminations for bare copper earth cables, complete, including gland shroud, lugs, tag numbers, etc and connection.				
E8-69		1.5mm²	No	1	180.83	Rate Only
E8-70		2.5mm²	No	310	180.83	R 56,057.90
E8-71		4mm²	No	14	180.83	R 2,531.65
E8-72		6mm²	No	26	218.12	R 5,671.20
E8-73		10mm²	No	2	218.12	R 436.25
E8-74		16mm²	No	20	314.93	R 6,298.66
E8-75		25mm²	No	18	314.93	R 5,668.79
E8-76		35mm²	No	18	314.93	R 5,668.79
E8-77		50mm²	No	1	435.71	Rate Only
E8-78		70mm²	No	8	435.71	R 3,485.68
E8-79		95mm²	No	2	730.69	R 1,461.38
E8-80		120mm²	No	2	730.69	R 1,461.38
E8-81		150mm²	No	4	730.69	R 2,922.77
E8-82		185mm²	No	1	1247.28	Rate Only
E8-83		240mm²	No	1	1875.14	Rate Only
E8-84		300mm²	No	1	1875.14	Rate Only
		Carried forward / ...				R 54,277,073.43

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 54,277,073.43
		Allow for all costs and expenses in connection with the site installation of the following:				
		Cu/PVC Insulated/PVC Bedded/SWA/PVC Sheathed 600/1000V multicore cable with stranded conductors.				
E8-85		1.5mm² x 3 core	m	1	13.12	Rate Only
E8-86		2.5mm² x 3 core	m	72 680	11.93	R 867,132.97
E8-87		1.5mm² x 4 core	m	1	13.12	Rate Only
E8-88		2.5mm² x 4 core	m	60 550	11.93	R 722,411.96
E8-89		4mm² x 4 core	m	16 510	14.32	R 236,373.67
E8-90		6mm² x 4 core	m	18 670	14.32	R 267,298.39
E8-91		10mm² x 4 core	m	2 120	14.32	R 30,352.04
E8-92		16mm² x 4 core	m	4 000	14.32	R 57,268.00
E8-93		25mm² x 4 core	m	15 195	17.90	R 271,933.52
E8-94		35mm² x 4 core	m	18 560	17.90	R 332,154.40
E8-95		50mm² x 4 core	m	3 590	20.28	R 72,813.88
E8-96		70mm² x 4 core	m	7 540	23.86	R 179,916.97
E8-97		95mm² x 4 core	m	6 100	47.72	R 291,112.33
E8-98		120mm² x 4 core	m	6 140	71.59	R 439,531.90
E8-99		150mm² x 4 core	m	680	83.52	R 56,790.77
E8-100		185mm² x 4 core	m	1	104.99	Rate Only
E8-101		240mm² x 4 core	m	1	131.24	Rate Only
E8-102		300mm² x 4 core	m	1	157.49	Rate Only
		Cable terminations for Cu/PVC Insulated/PVC Bedded/SWA/PVC Sheathed 600/1000V multicore cables, complete, including gland shroud, lugs, number tags, etc and connection.				
E8-103		1.5mm² x 3 core	No	1	128.61	Rate Only
E8-104		2.5mm² x 3 core	No	674	116.92	R 78,805.54
		Carried forward / ...				R 58,180,969.76

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 58,180,969.76
E8-105		1.5mm² x 4 core	No	1	128.61	Rate Only
E8-106		2.5mm² x 4 core	No	586	194.47	R 113,960.93
E8-107		4mm² x 4 core	No	100	194.47	R 19,447.26
E8-108		6mm² x 4 core	No	132	232.65	R 30,709.97
E8-109		10mm² x 4 core	No	26	232.65	R 6,048.93
E8-110		16mm² x 4 core	No	54	272.02	R 14,689.24
E8-111		25mm² x 4 core	No	134	272.02	R 36,451.08
E8-112		35mm² x 4 core	No	158	272.02	R 42,979.63
E8-113		50mm² x 4 core	No	46	349.57	R 16,080.38
E8-114		70mm² x 4 core	No	66	697.95	R 46,064.95
E8-115		95mm² x 4 core	No	64	697.95	R 44,669.04
E8-116		120mm² x 4 core	No	62	697.95	R 43,273.13
E8-117		150mm² x 4 core	No	8	930.61	R 7,444.84
E8-118		185mm² x 4 core	No	1	1023.67	Rate Only
E8-119		240mm² x 4 core	No	1	1279.58	Rate Only
E8-120		300mm² x 4 core	No	1	1279.58	Rate Only
		Cu/PVC Insulated/PVC Bedded/AWA/PVC Sheathed 600/1000V single core cable with stranded conductors. Cable fixed to cable tray, drawn into sleeves or laid into trenches.				
E8-121		95mm² x 1 core	m	1	19.69	Rate Only
E8-122		120mm² x 1 core	m	120	17.90	R 2,147.55
E8-123		150mm² x 1 core	m	1	22.31	Rate Only
E8-124		185mm² x 1 core	m	1	22.31	Rate Only
E8-125		240mm² x 1 core	m	1	26.25	Rate Only
E8-126		300mm² x 1 core	m	120	47.72	R 5,726.80
E8-127		400mm² x 1 core	m	1	78.74	Rate Only
		Carried forward / ...				R 58,610,663.49

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 58,610,663.49
E8-128		500mm² x 1 core	m	1	91.87	Rate Only
		Cable terminations for Cu/PVC Insulated/PVC Bedded/AWA/PVC Sheathed 600/1000V single core cables, complete, including gland shroud, lugs, tag numbers, etc and connection.				
E8-129		95mm² x 1 core	No	1	299.23	Rate Only
E8-130		120mm² x 1 core	No	16	272.02	R 4,352.37
E8-131		150mm² x 1 core	No	1	384.53	Rate Only
E8-132		185mm² x 1 core	No	1	384.53	Rate Only
E8-133		240mm² x 1 core	No	1	767.75	Rate Only
E8-134		300mm² x 1 core	No	16	697.95	R 11,167.26
E8-135		400mm² x 1 core	No	1	767.75	Rate Only
E8-136		500mm² x 1 core	No	1	1023.67	Rate Only
		Bare Copper Earth cable with stranded conductors.				
E8-137		1.5mm²	m	1	6.56	Rate Only
E8-138		2.5mm²	m	33 810	5.97	R 201,690.74
E8-139		4mm²	m	2 150	5.97	R 12,825.65
E8-140		6mm²	m	6 430	8.35	R 53,700.68
E8-141		10mm²	m	120	10.74	R 1,288.53
E8-142		16mm²	m	1 155	10.74	R 12,402.10
E8-143		25mm²	m	840	13.12	R 11,024.09
E8-144		35mm²	m	1 840	13.12	R 24,148.01
E8-145		50mm²	m	1	14.44	Rate Only
E8-146		70mm²	m	480	13.12	R 6,299.48
E8-147		95mm²	m	1	17.06	Rate Only
E8-148		120mm²	m	120	15.51	R 1,861.21
E8-149		150mm²	m	30	19.09	R 572.68
E8-150		185mm²	m	1	21.00	Rate Only
		Carried forward / ...				R 58,951,996.28

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 58,951,996.28
E8-151		240mm²	m	1	26.25	Rate Only
E8-152		300mm²	m	1	26.25	Rate Only
		Cable terminations for bare copper earth cables, complete, including gland shroud, lugs, tag numbers, etc and connection.				
E8-153		1.5mm²	No	1	43.31	Rate Only
E8-154		2.5mm²	No	310	39.37	R 12,205.24
E8-155		4mm²	No	14	39.37	R 551.20
E8-156		6mm²	No	26	65.62	R 1,706.11
E8-157		10mm²	No	2	65.62	R 131.24
E8-158		16mm²	No	20	77.55	R 1,551.01
E8-159		25mm²	No	18	77.55	R 1,395.91
E8-160		35mm²	No	18	77.55	R 1,395.91
E8-161		50mm²	No	1	99.74	Rate Only
E8-162		70mm²	No	8	90.67	R 725.39
E8-163		95mm²	No	2	116.92	R 233.84
E8-164		120mm²	No	2	116.92	R 233.84
E8-165		150mm²	No	4	116.92	R 467.69
E8-166		185mm²	No	1	255.92	Rate Only
E8-167		240mm²	No	1	341.22	Rate Only
E8-168		300mm²	No	1	341.22	Rate Only
E8-169		Additional cables as requested by the Engineer due to process design changes	Prov Sum	1	200 000	R 200,000.00
E8-170		Percentage adjustment on above item for Contractor's overheads and profit	%	200 000		R 32,000.00
		EXCAVATIONS				
		Excavate and set excavated material aside for re-use as filling for cable or sleeve trench not exceeding 1m deep				
E8-171		In earth	m	8 620	450.00	R 3,879,000.00
		Carried forward / ...				R 63,083,593.67

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 63,083,593.67
E8-172		In soft rock	m	240	800.00	R 192,000.00
E8-173		In rock	m	1	1500.00	Rate Only
E8-174		Selected and approved material for backfilling, bedding and cover	m	4 240	450.00	R 1,908,000.00
E8-175		Surplus excavated material spread and levelled on site as directed	m	500	350.00	R 175,000.00
E8-176		Danger tape - 400mm wide overlapping	m	17 720	8.00	R 141,760.00
E8-177		Cable marker, with engraved aluminium plate	No	250	750.00	R 187,500.00
E8-178		Fire stopping material for penetrative areas and cable box outs	m³	200	450.00	R 90,000.00
E8-179		Cable coating as fire stopping for cables (1m per cable)	m³	800	550.00	R 440,000.00
E8-180		Additional specialist fire stopping measures as directed by the Engineer	Prov Sum	1	175 000	R 175,000.00
E8-181		Percentage adjustment on above item for Contractor's overheads and profit	%	175 000		R 28,000.00
		Other:-				
E8-182		**All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify):-**				
		Tagging of equipment	**No.**	**9 055**	33.48	R 303,116.13
		Supply 2x1.00 Braid Scr Blue Intrinsic Braid	**m**	**1**	57.46	Rate Only
		Install 2x1.00 Braid Scr Blue Intrinsic Braid	**m**	**1**	9.73	Rate Only
		Supply 2x1.00 Braid SI Termination	**No.**	**1**	257.77	Rate Only
		Install 2x1.00 Braid SI Termination	**No.**	**1**	155.68	Rate Only
TOTAL OF BILL E8 CARRIED TO SUMMARY						**R 66,723,969.80**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3B Section B1	**BILL E9**				
	23	**CABLE SUPPORTS**				
		Allow for all costs and expenses in connection with the supply and delivery of the following:				
		Stainless steel 316 cable ladder, 2mm thick side rails, channel cross rungs at 300mm centres, complete with couplers, clamps, threaded rods, hangers, cantilevers, brackets etc. to fix to trusses, walls for large installations				
E9-1		All equipment associated with Inlet Works MCC 92EI03-PNL01	Sum	1	5083132.10	R 5,083,132.10
E9-2		All equipment associated with Bioreactor MCC 92EI04-PNL01	Sum	1	124325.68	R 124,325.68
E9-3		All equipment associated with Blower MCC 92EI02-PNL01	Sum	1	2381955.90	R 2,381,955.90
E9-4		All equipment associated with Dewatering MCC 92EI01-PNL01	Sum	1	20766352.45	R 20,766,352.45
E9-5		All equipment associated with Service Water MCC 92EI06-PNL01	Sum	1	5933789.41	R 5,933,789.41
E9-6		All equipment associated with Ultraviolet MCC 92EI02-PNL01	Sum	1	2345954.96	R 2,345,954.96
		Stainless steel 316 welded wire mesh cable tray, 50 x 50mm base aperture, 25 x 50mm side aperture, complete with splices, couplers, clamps, threaded rods, hangers, brackets etc to fix to trusses, walls etc for small installations				
E9-7		All equipment associated with Inlet Works MCC 92EI03-PNL01	Sum	1	1415615.22	R 1,415,615.22
E9-8		All equipment associated with Bioreactor MCC 92EI04-PNL01	Sum	1	262589.07	R 262,589.07
E9-9		All equipment associated with Blower MCC 92EI02-PNL01	Sum	1	1242146.43	R 1,242,146.43
E9-10		All equipment associated with Dewatering MCC 92EI01-PNL01	Sum	1	8254721.70	R 8,254,721.70
		Carried forward / ...				R 47,810,582.91

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 47,810,582.91
E9-11		All equipment associated with Service Water MCC 92EI06-PNL01	Sum	1	1932142.81	R 1,932,142.81
E9-12		All equipment associated with Ultraviolet MCC 92EI02-PNL01	Sum	1	595431.18	R 595,431,18
		Allow for all costs and expenses in connection with the installation of the following:				
		Stainless steel 316 cable ladder, 3mm thick side rails, channel cross rungs at 300mm centres, complete with couplers, clamps, threaded rods, hangers, cantilevers, brackets etc. to fix to trusses, walls for large installations				
E9-13		All equipment associated with Inlet Works MCC 92EI03-PNL01	Sum	1	581656.03	R 581,656.03
E9-14		All equipment associated with Bioreactor MCC 92EI04-PNL01	Sum	1	11620.91	R 11,620.91
E9-15		All equipment associated with Blower MCC 92EI02-PNL01	Sum	1	281535.61	R 281,535.61
E9-16		All equipment associated with Dewatering MCC 92EI01-PNL01	Sum	1	2480591.60	R 2,480,591.60
E9-17		All equipment associated with Service Water MCC 92EI06-PNL01	Sum	1	717984.98	R 717,984.98
E9-18		All equipment associated with Ultraviolet MCC 92EI02-PNL01	Sum	1	263118.60	R 263,118.00
		Stainless steel 316 welded wire mesh cable tray, 50 x 50mm base aperture, 25 x 50mm side aperture, complete with splices, couplers, clamps, threaded rods, hangers, brackets etc to fix to trusses, walls etc for small installations				
E9-19		All equipment associated with Inlet Works MCC 92EI03-PNL01	Sum	1	323740.68	R 323,740.68
E9-20		All equipment associated with Bioreactor MCC 92EI04-PNL01	Sum	1	53268.41	R 53,268.41
E9-21		All equipment associated with Blower MCC 92EI02-PNL01	Sum	1	246812.05	R 246,812.05
E9-22		All equipment associated with Dewatering MCC 92EI01-PNL01	Sum	1	1945263.14	R 1,945,263.14
		Carried forward / ...				R 57,243,748.92

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 57,243,748.92
E9-23		All equipment associated with Service Water MCC 92EI06-PNL01	Sum	1	469247.43	R 469,247.43
E9-24		All equipment associated with Ultraviolet MCC 92EI02-PNL01	Sum	1	147314.98	R 147,314.98
		Other:-				
E9-25		**All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify):-**				
		Bonding All equipment associated with Inlet Works MCC 92EI03-PNL01	**Sum**	**1**	164885.04	R 164,885.04
		Bonding All equipment associated with Bioreactor MCC 92EI04-PNL01	**Sum**	**1**	220856.70	R 220,856.70
		Bonding All equipment associated with Blower MCC 92EI02-PNL01	**Sum**	**1**	84446.93	R 84,446.93
		Bonding All equipment associated with Dewatering MCC 92EI01-PNL01	**Sum**	**1**	571615.80	R 571,615.80
		Bonding All equipment associated with Service Water MCC 92EI06-PNL01	**Sum**	**1**	139828.71	R 139,828.71
		Bonding All equipment associated with Ultraviolet MCC 92EI02-PNL01	**Sum**	**1**	137347.48	R 137,347.48
TOTAL OF BILL E9 CARRIED TO SUMMARY						**R 59,179,291.98**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount	
		BILL E10					
	Vol 3B Section B1						
	22	**AREA LIGHTING**					
		Allow for all the costs and expenses in connection with the design, manufacture, routine testing, factory acceptance testing (if indicated), supply, delivery, offloading and storage of the following materials and equipment:					
		Lighting					
E10-1		Type D: LED Streetlight	No	160	3775.98	R	604,156.80
E10-2		Type E: LED Floodlight	No	275	8162.54	R	2,244,699.60
		GRP streetlight pole complete with brackets and accessories etc.					
E10-3		4.6m GRP for 2 x LED Streetlights	No	35	10639.69	R	372,389.29
E10-4		4.6m GRP for 1 x LED Streetlight	No	50	9307.39	R	465,369.45
E10-5		8m GRP for 1 x LED Streetlight/Floodlight	No	90	9055.66	R	815,009.13
E10-6		8m GRP for 1 x LED Streetlight and 1 x LED Floodlight	No	44	11756.42	R	517,282.48
E10-7		11.6m GRP for 6 x LED Floodlight	No	34	24254.65	R	824,657.96
E10-8		Beka Sozella 420 or equivalent (with movement sensor) and pole	No	4	13865.35	R	55,461.38
		Electrical kiosks					
E10-9		Kiosk together with plinth	No	8	72982.38	R	583,859.06
		Cables					
		Cu/PVC Insulated/PVC Bedded/SWA/PVC Sheathed 600/1000V multicore cable with stranded conductors.					
E10-10		2.5mm² x 4 core	m	3 450	51.54	R	177,806.48
E10-11		4mm² x 4 core	m	1 050	77.66	R	81,545.10
E10-12		6mm² x 4 core	m	3 350	104.44	R	349,880.70
E10-13		10mm² x 4 core	m	2 000	154.57	R	309,148.32
E10-14		16mm² x 4 core	m	1	242.26		Rate Only
		Carried forward / ...				R	7,401,265.75

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 7,401,265.75
E10-15		25mm² x 4 core	m	1	379.25	Rate Only
		Cable terminations for Cu/PVC Insulated/PVC Bedded/SWA/PVC Sheathed 600/1000V multicore cables, complete, including gland shroud, lugs, number tags, etc and connection.				
E10-16		2.5mm² x 4 core	No	93	218.12	R 20,285.45
E10-17		4mm² x 4 core	No	18	218.12	R 3,926.22
E10-18		6mm² x 4 core	No	70	314.93	R 22,045.30
E10-19		10mm² x 4 core	No	42	314.93	R 13,227.18
E10-20		16mm² x 4 core	No	1	435.71	Rate Only
E10-21		25mm² x 4 core	No	1	435.71	Rate Only
		Bare copper earth cable with stranded conductors.				
E10-22		2.5mm²	m	3 450	7.75	R 26,747.19
E10-23		4mm²	m	1 050	13.02	R 13,665.83
E10-24		6mm²	m	3 350	15.40	R 51,584.98
E10-25		10mm²	m	2 000	26.71	R 53,426.10
E10-26		16mm²	m	1	45.21	Rate Only
E10-27		25mm²	m	1	73.76	Rate Only
		Cable terminations for bare copper earth cables, complete, including gland shroud, lugs, number tags, etc and connection.				
E10-28		2.5mm²	No	93	180.83	R 16,817.37
E10-29		4mm²	No	18	180.83	R 3,254.98
E10-30		6mm²	No	70	218.12	R 15,268.62
E10-31		10mm²	No	42	218.12	R 9,161.17
E10-32		16mm²	No	1	314.93	Rate Only
E10-33		25mm²	No	1	314.93	Rate Only
		Allow for all costs and expenses in connection with the Site installation of the following:				
		Carried forward / ...				R 7,650,676.13

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 7,650,676.13
		Lighting				
E10-34		Type D: LED Streetlight	No	160	1491.35	R 238,616.67
E10-35		Type E: LED Floodlight	No	275	1491.35	R 410,122.40
		GRP streetlight pole complete with brackets and accessories etc.				
E10-36		4.6m GRP for 2 x LED Streetlights	No	35	5726.80	R 200,438.00
E10-37		4.6m GRP for 1 x LED Streetlight	No	50	5726.80	R 286,340.00
E10-38		8m GRP for 1 x LED Streetlight	No	90	8590.20	R 773,118.00
E10-39		8m GRP for 1 x LED Streetlight and 1 x LED Floodlight	No	44	8590.20	R 377,968.80
E10-40		11.6m GRP for 6 x LED Floodlight	No	34	11453.60	R 389,422.40
E10-41		Beka Sozella 420 or equivalent (with movement sensor) and pole	No	4	11453.60	R 45,814.40
		Electrical kiosks				
E10-42		Kiosk together with plinth	No	8	4295.10	R 34,360.80
		Cables				
		Cu/PVC Insulated/PVC Bedded/SWA/PVC Sheathed 600/1000V multicore cable with stranded conductors.				
E10-43		2.5mm² x 4 core	m	3 450	11.93	R 41,161.38
E10-44		4mm² x 4 core	m	1 050	14.32	R 15,032.85
E10-45		6mm² x 4 core	m	3 350	14.32	R 47,961.95
E10-46		10mm² x 4 core	m	2 000	14.32	R 28,634.00
E10-47		16mm² x 4 core	m	1		Rate Only
E10-48		25mm² x 4 core	m	1		Rate Only
		Cable terminations for Cu/PVC Insulated/PVC Bedded/SWA/PVC Sheathed 600/1000V multicore cables, complete, including gland shroud, lugs, number tags, etc and connection.				
E10-49		2.5mm² x 4 core	No	93	194.47	R 18,085.95
E10-50		4mm² x 4 core	No	18	194.47	R 3,500.51
		Carried forward / ...				R 10,561,254.22

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 10,561,254.22
E10-51		6mm² x 4 core	No	70	232.65	R 16,285.59
E10-52		10mm² x 4 core	No	42	232.65	R 9,771.35
E10-53		16mm² x 4 core	No	1	299.23	Rate Only
E10-54		25mm² x 4 core	No	1	299.23	Rate Only
		Bare copper earth cable with stranded conductors.				
E10-55		2.5mm²	m	3 450	5.97	R 20,580.69
E10-56		4mm²	m	1 050	5.97	R 6,263.69
E10-57		6mm²	m	3 350	8.35	R 27,977.80
E10-58		10mm²	m	2 000	10.74	R 21,475.50
E10-59		16mm²	m	1	11.81	Rate Only
E10-60		25mm²	m	1	14.44	Rate Only
		Cable terminations for bare copper earth cables, complete, including gland shroud, lugs, number tags, etc and connection.				
E10-61		2.5mm²	No	93	39.37	R 3,661.57
E10-62		4mm²	No	18	39.37	R 708.69
E10-63		6mm²	No	70	65.62	R 4,593.37
E10-64		10mm²	No	42	65.62	R 2,756.02
E10-65		16mm²	No	1	85.31	Rate Only
E10-66		25mm²	No	1	85.31	Rate Only
E10-67		Additional area lighting as requested by the Engineer due to road / site layout changes	Prov Sum	1	200 000	R 200,000.00
E10-68		Percentage adjustment on above item for Contractor's overheads and profit	%	200 000		R 32,000.00
		Other:-				
E10-69		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **.....** **.....**	Item			
TOTAL OF BILL E10 CARRIED TO SUMMARY						**R 10,907,328.50**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3B Section B1	**BILL E11**				
	13, 24	**EARTHING**				
		Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:				
E11-1		Ground Resistivity Survey and report	Sum	1	11608.10	R 11,608.10
E11-2		MV Primary Substation foundation earth mat	No	3	26651.25	R 79,953.75
E11-3		MV Secondary Substation foundation earth mat	No	6	26651.25	R 159,907.50
E11-4		Isolation Transformer earth matt	No	2	26651.25	R 53,302.50
E11-5		Distribution Transformer earth mat and earthing	No	23	10068.25	R 231,569.75
E11-6		MV earthing and MV electrodes	Sum	1	14806.25	R 14,806.25
E11-7		Earthing arrangement and equipotential bonding for installation	Sum	1	14806.25	R 14,806.25
		Earth bars				
E11-8		All earth bars associated with Inlet Works MCC 92EI03-PNL01	Sum	1	14806.25	R 14,806.25
E11-9		All earth bars associated with Bioreactor MCC 92EI04-PNL01	Sum	1	14806.25	R 14,806.25
E11-10		All earth bars associated with Blower MCC 92EI02-PNL01	Sum	1	14806.25	R 14,806.25
E11-11		All earth bars associated with Dewatering MCC 92EI01-PNL01	Sum	1	14806.25	R 14,806.25
E11-12		All earth bars associated with Service Water MCC 92EI06-PNL01	Sum	1	14806.25	R 14,806.25
E11-13		All earth bars associated with Ultraviolet MCC 92EI02-PNL01	Sum	1	14806.25	R 14,806.25
E11-14		All earth bars associated with Primary Settling Tank MCC 92EI03-PNL02	Sum	1	14806.25	R 14,806.25
		Building earth rings				
		Carried forward / ...				R 669,597.85

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 669,597.85
E11-15		Inlet Works Electrical Building earth ring	Sum	1	175670.83	R 175,670.83
E11-16		Bioreactor Building earth ring	Sum	1	155714.37	R 155,714.37
E11-17		Blower Building earth ring	Sum	1	242561.91	R 242,561.91
E11-18		Dewatering Building earth ring	Sum	1	333105.09	R 333,105.09
E11-19		Service Water Building earth ring	Sum	1	137236.17	R 137,236.17
E11-20		Ultraviolet Electrical Building earth ring	Sum	1	163105.65	R 163,105.65
E11-21		Primary Settling Tank Electrical Building earth ring	Sum	1	235170.63	R 235,170.63
		Allow for all costs and expenses in connection with the Site installation of the following:-				
E11-22		MV Primary Substation foundation earth mat	No	3	10428.75	R 31,286.25
E11-23		MV Secondary Substation foundation earth mat	No	6	10428.75	R 62,572.50
E11-24		Transformer earth mat and earthing	No	23	6952.50	R 159,907.50
E11-25		MV earthing and MV electrodes	Sum	1	3862.50	R 3,862.50
E11-26		Earthing arrangement and equipotential bonding for installation	Sum	1	20600.00	R 20,600.00
		Earth bars				
E11-27		All earth bars associated with Inlet Works MCC 92EI03-PNL01	Sum	1	3862.50	R 3,862.50
E11-28		All earth bars associated with Bioreactor MCC 92EI04-PNL01	Sum	1	3862.50	R 3,862.50
E11-29		All earth bars associated with Dewatering MCC 92EI01-PNL01	Sum	1	3862.50	R 3,862.50
E11-30		All earth bars associated with Service Water MCC 92EI06-PNL01	Sum	1	3862.50	R 3,862.50
E11-31		All earth bars associated with Ultraviolet MCC 92EI02-PNL01	Sum	1	3862.50	R 3,862.50
E11-32		All earth bars associated with Primary Settling Tank MCC 92EI03-PNL02	Sum	1	3862.50	R 3,862.50
		Building earth rings				
		Carried forward / ...				R 2,413,566.25

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 2,413,566.25
E11-33		Inlet Works Electrical Building earth ring	Sum	1	8806.50	R 8,806.50
E11-34		Bioreactor Building earth ring	Sum	1	8806.50	R 8,806.50
E11-35		Blower Building earth ring	Sum	1	8806.50	R 8,806.50
E11-36		Dewatering Building earth ring	Sum	1	8806.50	R 8,806.50
E11-37		Service Water Building earth ring	Sum	1	8806.50	R 8,806.50
E11-38		Ultraviolet Electrical Building earth ring	Sum	1	8806.50	R 8,806.50
E11-39		Primary Settling Tank Electrical Building earth ring	Sum	1	8806.50	R 8,806.50
E11-40		Additional earthing as requested by the Engineer due to road / site layout changes	Prov Sum	1	200 000	R 200,000.00
E11-41		Percentage adjustment on above item for Contractor's overheads and profit	%	200 000		R 32,000.00
		Other:-				
E11-42		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify)	Item	-		
		MV Station	**Sum**	**1**	248347.01	R 248,347.01
		CHP	**Sum**	**1**	201412.38	R 201,412.38
		Generators	**Sum**	**1**	254999.16	R 254,999.16
		P&Gs	**Sum**	**1**	2934047.90	R 2,934,047.90
		……..				
TOTAL OF BILL E11 CARRIED TO SUMMARY						**R 6,346,018.19**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3B Section B1	**BILL E12**				
	12	**DIESEL GENERATORS**				
		Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:				
		Centralised Diesel Generator Sets				
E12-1		Diesel generator - 1250 kWe Prime Power	No	6	5442496.00	R 32,654,976.00
E12-2		Diesel generator - alternative solution (1250 kWe)	No	1	6640617.00	Rate Only
E12-3		Modified Exhaust System	No	6	226974.00	R 1,361,844.00
E12-4		Radiator Ducting	No	6	60991.00	R 365,946.00
E12-5		Overhead busbar trunking	No	6		
E12-6		Sound Attenuated Inlet Louvres	No	7	170470.00	R 1,193,290.00
E12-7		Sound Attenuated Outlet Louvres	No	7	250745.00	R 1,755,215.00
E12-8		Fire extinguishers	No	14	1261.00	R 17,654.00
E12-9		Generator controllers (engine and master sync) and integrated control system, control cabling, network system, generator auxiliary power cabling and integration of generator controller with PCS and collector substation	Sum	1	391695.00	R 391,695.00
E12-10		32mm high open GRP trench covers for Diesel Generators rooms, complete with all mounting accessories	Sum	1	187516.00	R 187,516.00
		Fuel System				
E12-11		Bulk Diesel 24,000 liter Storage Tank, complete with instrumentation	No	2	1,608,618.00	R 3,217,236.00
E12-12		Bulk Fuel polishing system complete	No	2	130,929.00	R 261,858.00
E12-13		Fuel transfer pumps complete	No	2	349,623.00	R 699,246.00
E12-14		Fuel transfer pumps control panel	Sum	1	27,383.00	R 27,383.00
E12-15		Fuel pipework and valves	Sum	1	1,527,785.00	R 1,527,785.00
		Carried forward / ...				R 43,661,644.00

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 43,661,644.00
E12-16		Filtering and relocation of fuel from existing genset to new fuel tanks	liter	1 000	30.00	R 30,000.00
E12-17		Fuel filling delivery coupling system	No	2	86392.00	R 172,784.00
		Allow for all costs and expenses in connection with the Site installation of the following:-				
E12-18		All materials and equipment summarized in BILL E12 complete	Sum	1	907529.00	R 907,529.00
E12-19		Regular servicing of generators	No	6	32842.00	R 197,052.00
		Provisional Sums				
E12-20		Provisional Sum for provision of additional temporary power during construction or changeover	Prov Sum	1	200 000	R 200,000.00
E12-21		Percentage adjustment on above item for Contractor's overheads and profit	%	200 000		R 32,000.00
		Other:-				
E12-22		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **.....** **.....** **.....** **.....** **.....**	Item	-		
TOTAL OF BILL E12 CARRIED TO SUMMARY						**R 45,201,009.00**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3B Section B2	**BILL E13**				
	16	**INSTRUMENTATION AND FIELDBUS CABLES**				
		Allow for all costs and expenses in connection with the supply, delivery, offloading and storage of the following:				
		Inlet Works				
E13-1		1,5 mm² 1-pair scr	m	1	39.67	Rate Only
E13-2		1,5 mm² 2-pair o/all scr	m	9 500	64.25	R 610,329.59
E13-3		1,5 mm² 2-pair ind scr, o/all scr	m	1	74.48	Rate Only
E13-4		1,5 mm² 4-pair o/all scr	m	1	108.86	Rate Only
E13-5		1,5 mm² 4-pair ind scr, o/all scr	m	1	119.91	Rate Only
E13-6		1,5 mm² 8-pair o/all scr	m	9 000	178.60	R 1,607,434.69
E13-7		1,5 mm² 8-pair ind scr, o/all scr	m	1	214.85	Rate Only
E13-8		1,5 mm² 12-pair o/all scr	m	1	297.26	Rate Only
E13-9		1,5 mm² 12-pair ind scr, o/all scr	m	1	306.48	Rate Only
E13-10		1,5 mm² 24-pair o/all scr	m	1	533.70	Rate Only
E13-11		1,5 mm² 24-pair ind scr, o/all scr	m	1	699.20	Rate Only
E13-12		CAT6E Network Cable	m	120	91.05	R 10,926.24
E13-13		2.5mm² x 3 core	m	4 500	56.24	R 253,071.00
E13-14		16mm² x 1 core Insulated Earth wire	m	4 500	47.67	R 214,507.80
		Bioreactor				
E13-15		1,5 mm² 1-pair scr	m	1	39.67	Rate Only
E13-16		1,5 mm² 2-pair o/all scr	m	13 000	64.25	R 835,187.86
E13-17		1,5 mm² 2-pair ind scr, o/all scr	m	1	74.48	Rate Only
E13-18		1,5 mm² 4-pair o/all scr	m	1	108.86	Rate Only
E13-19		1,5 mm² 4-pair ind scr, o/all scr	m	1	119.91	Rate Only
E13-20		1,5 mm² 8-pair o/all scr	m	13 500	178.60	R 2,411,152.03
E13-21		1,5 mm² 8-pair ind scr, o/all scr	m	1	214.85	Rate Only
		Carried forward / ...				R 5,942,609.21

		Brought forward / ...				R	5,942,609.21
E13-22		1,5 mm² 12-pair o/all scr	m	1	297.26		Rate Only
E13-23		1,5 mm² 12-pair ind scr, o/all scr	m	1	306.48		Rate Only
E13-24		1,5 mm² 24-pair o/all scr	m	1	533.70		Rate Only
E13-25		1,5 mm² 24-pair ind scr, o/all scr	m	1	699.20		Rate Only
E13-26		CAT6E Network Cable	m	40	91.05	R	3,642.08
E13-27		2.5mm² x 3 core	m	5 710	56.24	R	321,118.98
E13-28		16mm² x 1 core Insulated Earth wire	m	5 710	47.67	R	272,186.56
		Primary Settling					
E13-29		1,5 mm² 2-pair o/all scr	m	2 700	64.25	R	173,462.09
E13-30		1,5 mm² 2-pair ind scr, o/all scr	m	1	74.48		Rate Only
E13-31		1,5 mm² 4-pair o/all scr	m	1	108.86		Rate Only
E13-32		1,5 mm² 4-pair ind scr, o/all scr	m	1	119.91		Rate Only
E13-33		1,5 mm² 8-pair o/all scr	m	2 000	178.60	R	357,207.71
E13-34		1,5 mm² 8-pair ind scr, o/all scr	m	1	214.85		Rate Only
E13-35		1,5 mm² 12-pair o/all scr	m	1	297.26		Rate Only
E13-36		1,5 mm² 12-pair ind scr, o/all scr	m	1	306.48		Rate Only
E13-37		1,5 mm² 24-pair o/all scr	m	1	533.70		Rate Only
E13-38		1,5 mm² 24-pair ind scr, o/all scr	m	1	699.20		Rate Only
E13-39		CAT6E Network Cable	m	1	98.06		Rate Only
E13-40		2.5mm² x 3 core	m	1 400	56.24	R	78,733.20
E13-41		16mm² x 1 core Insulated Earth wire	m	1 400	47.67	R	66,735.76
		Secondary Settling					
E13-42		1,5 mm² 1-pair scr	m	1	39.67		Rate Only
E13-43		1,5 mm² 2-pair o/all scr	m	9 500	64.25	R	610,329.59
E13-44		1,5 mm² 2-pair ind scr, o/all scr	m	1	74.48		Rate Only
E13-45		1,5 mm² 4-pair o/all scr	m	1	108.86		Rate Only
E13-46		1,5 mm² 4-pair ind scr, o/all scr	m	1	119.91		Rate Only
E13-47		1,5 mm² 8-pair o/all scr	m	5 000	178.60	R	893,019.27
		Carried forward / ...				R	8,719,044.45

		Brought forward / ...				R	8,719,044.45
E13-48		1,5 mm² 8-pair ind scr, o/all scr	m	1	214.85		Rate Only
E13-49		1,5 mm² 12-pair o/all scr	m	1	297.26		Rate Only
E13-50		1,5 mm² 12-pair ind scr, o/all scr	m	1	306.48		Rate Only
E13-51		1,5 mm² 24-pair o/all scr	m	1	533.70		Rate Only
E13-52		CAT6E Network Cable	m	400	91.05	R	36,420.80
E13-53		2.5mm² x 3 core	m	11 000	56.24	R	618,618.00
E13-54		16mm² x 1 core Insulated Earth wire	m	11 000	47.67	R	524,352.40
		Blowers					
E13-55		1,5 mm² 1-pair scr	m	1	39.67		Rate Only
E13-56		1,5 mm² 2-pair o/all scr	m	1	69.19		Rate Only
E13-57		1,5 mm² 2-pair ind scr, o/all scr	m	1	74.48		Rate Only
E13-58		1,5 mm² 4-pair o/all scr	m	1			Rate Only
E13-59		1,5 mm² 4-pair ind scr, o/all scr	m	1	119.91		Rate Only
E13-60		1,5 mm² 8-pair o/all scr	m	1	192.34		Rate Only
E13-61		1,5 mm² 8-pair ind scr, o/all scr	m	1	214.85		Rate Only
E13-62		1,5 mm² 12-pair o/all scr	m	1	297.26		Rate Only
E13-63		1,5 mm² 12-pair ind scr, o/all scr	m	1	306.48		Rate Only
E13-64		1,5 mm² 24-pair o/all scr	m	1	533.70		Rate Only
E13-65		1,5 mm² 24-pair ind scr, o/all scr	m	1	699.20		Rate Only
E13-66		CAT6E Network Cable	m	400	91.05	R	36,420.80
E13-67		2.5mm² x 3 core	m	400	56.24	R	22,495.20
E13-68		16mm² x 1 core Insulated Earth wire	m	400	47.67	R	19,067.36
		Dewatering					
E13-69		1,5 mm² 1-pair scr	m	1	39.67		Rate Only
E13-70		1,5 mm² 2-pair o/all scr	m	16 950	64.25	R	1,088,956.48
E13-71		1,5 mm² 2-pair ind scr, o/all scr	m	450	69.16	R	31,122.91
E13-72		1,5 mm² 4-pair o/all scr	m	1	108.86		Rate Only
E13-73		1,5 mm² 4-pair ind scr, o/all scr	m	1	119.91		Rate Only
		Carried forward / ...				R	11,096,498.40

		Brought forward / ...				R	11,096,498.40
E13-74		1,5 mm² 8-pair o/all scr	m	16 850	178.60	R	3,009,474.94
E13-75		1,5 mm² 8-pair ind scr, o/all scr	m	1	214.85		Rate Only
E13-76		1,5 mm² 12-pair o/all scr	m	1	297.26		Rate Only
E13-77		1,5 mm² 12-pair ind scr, o/all scr	m	1	306.48		Rate Only
E13-78		1,5 mm² 24-pair o/all scr	m	1	533.70		Rate Only
E13-79		1,5 mm² 24-pair ind scr, o/all scr	m	1	699.20		Rate Only
E13-80		CAT6E Network Cable	m	850	91.05	R	77,394.20
E13-81		2.5mm² x 3 core	m	14 250	56.24	R	801,391.50
E13-82		16mm² x 1 core Insulated Earth wire	m	14 000	47.67	R	667,357.60
		Primary Sludge					
E13-83		1,5 mm² 1-pair scr	m	1	39.67		Rate Only
E13-84		1,5 mm² 2-pair o/all scr	m	5 000	64.25	R	321,226.10
E13-85		1,5 mm² 2-pair ind scr, o/all scr	m	1	74.48		Rate Only
E13-86		1,5 mm² 4-pair o/all scr	m	1	108.86		Rate Only
E13-87		1,5 mm² 4-pair ind scr, o/all scr	m	1	119.91		Rate Only
E13-88		1,5 mm² 8-pair o/all scr	m	5 500	178.60	R	982,321.20
E13-89		1,5 mm² 8-pair ind scr, o/all scr	m	1	214.85		Rate Only
E13-90		1,5 mm² 12-pair o/all scr	m	1	297.26		Rate Only
E13-91		1,5 mm² 12-pair ind scr, o/all scr	m	1	306.48		Rate Only
E13-92		1,5 mm² 24-pair o/all scr	m	1	533.70		Rate Only
E13-93		1,5 mm² 24-pair ind scr, o/all scr	m	1	699.20		Rate Only
E13-94		CAT6E Network Cable	m	150	91.05	R	13,657.80
E13-95		2.5mm² x 3 core	m	2 400	56.24	R	134,971.20
E13-96		16mm² x 1 core Insulated Earth wire	m	2 400	47.67	R	114,404.16
		Waste Activated Sludge					
E13-97		1,5 mm² 1-pair scr	m	1	39.67		Rate Only
E13-98		1,5 mm² 2-pair o/all scr	m	15 000	64.25	R	963,678.30
E13-99		1,5 mm² 2-pair ind scr, o/all scr	m	1	74.48		Rate Only
		Carried forward / ...				R	18,182,375.40

		Brought forward / ...				R	18,182,375.40
E13-100		1,5 mm² 4-pair o/all scr	m	1	108.86		Rate Only
E13-101		1,5 mm² 4-pair ind scr, o/all scr	m	1	119.91		Rate Only
E13-102		1,5 mm² 8-pair o/all scr	m	15 000	178.60	R	2,679,057.81
E13-103		1,5 mm² 8-pair ind scr, o/all scr	m	1	214.85		Rate Only
E13-104		1,5 mm² 12-pair o/all scr	m	1	297.26		Rate Only
E13-105		1,5 mm² 12-pair ind scr, o/all scr	m	1	306.48		Rate Only
E13-106		1,5 mm² 24-pair o/all scr	m	1	533.70		Rate Only
E13-107		1,5 mm² 24-pair ind scr, o/all scr	m	1	699.20		Rate Only
E13-108		CAT6E Network Cable	m	450	91.05	R	40,973.40
E13-109		2.5mm² x 3 core	m	8 500	56.24	R	478,023.00
E13-110		16mm² x 1 core Insulated Earth wire	m	8 500	47.67	R	405,181.40
		Ultra Violet Filtration					
E13-111		1,5 mm² 1-pair scr	m	1	39.67		Rate Only
E13-112		1,5 mm² 2-pair o/all scr	m	700	64.25	R	44,971.65
E13-113		1,5 mm² 2-pair ind scr, o/all scr	m	1	74.48		Rate Only
E13-114		1,5 mm² 4-pair o/all scr	m	1	108.86		Rate Only
E13-115		1,5 mm² 4-pair ind scr, o/all scr	m	1	119.91		Rate Only
E13-116		1,5 mm² 8-pair o/all scr	m	7 500	178.60	R	1,339,528.91
E13-117		1,5 mm² 8-pair ind scr, o/all scr	m	1	214.85		Rate Only
E13-118		1,5 mm² 12-pair o/all scr	m	1	297.26		Rate Only
E13-119		1,5 mm² 12-pair ind scr, o/all scr	m	1	306.48		Rate Only
E13-120		1,5 mm² 24-pair o/all scr	m	1	533.70		Rate Only
E13-121		1,5 mm² 24-pair ind scr, o/all scr	m	1	699.20		Rate Only
E13-122		CAT6E Network Cable	m	700	91.05	R	63,736.40
E13-123		2.5mm² x 3 core	m	3 500	56.24	R	196,833.00
E13-124		16mm² x 1 core Insulated Earth wire	m	3 500	47.67	R	166,839.40
		Service Water					
E13-125		1,5 mm² 1-pair scr	m	1	39.67		Rate Only
		Carried forward / ...				R	23,597,520.37

		Brought forward / ...				R	23,597,520.37
E13-126		1,5 mm² 2-pair o/all scr	m	3 500	64.25	R	224,858.27
E13-127		1,5 mm² 2-pair ind scr, o/all scr	m	1	74.48		Rate Only
E13-128		1,5 mm² 4-pair o/all scr	m	1	108.86		Rate Only
E13-129		1,5 mm² 4-pair ind scr, o/all scr	m	1	119.91		Rate Only
E13-130		1,5 mm² 8-pair o/all scr	m	1	192.34		Rate Only
E13-131		1,5 mm² 8-pair ind scr, o/all scr	m	1	214.85		Rate Only
E13-132		1,5 mm² 12-pair o/all scr	m	1	297.26		Rate Only
E13-133		1,5 mm² 12-pair ind scr, o/all scr	m	1	306.48		Rate Only
E13-134		1,5 mm² 24-pair o/all scr	m	1	533.70		Rate Only
E13-135		1,5 mm² 24-pair ind scr, o/all scr	m	1	699.20		Rate Only
E13-136		CAT6E Network Cable	m	500	91.05	R	45,526.00
E13-137		2.5mm² x 3 core	m	5 500	56.24	R	309,309.00
E13-138		16mm² x 1 core Insulated Earth wire	m	5 500	47.67	R	262,176.20
		TSE Pump station					
E13-139		1,5 mm² 1-pair scr	m	1	39.67		Rate Only
E13-140		1,5 mm² 2-pair o/all scr	m	1 160	64.25	R	74,524.46
E13-141		1,5 mm² 2-pair ind scr, o/all scr	m	1	74.48		Rate Only
E13-142		1,5 mm² 4-pair o/all scr	m	1	108.86		Rate Only
E13-143		1,5 mm² 4-pair ind scr, o/all scr	m	1	119.91		Rate Only
E13-144		1,5 mm² 8-pair o/all scr	m	350	178.60	R	62,511.35
E13-145		1,5 mm² 8-pair ind scr, o/all scr	m	1	214.85		Rate Only
E13-146		1,5 mm² 12-pair o/all scr	m	1	297.26		Rate Only
E13-147		1,5 mm² 12-pair ind scr, o/all scr	m	1	306.48		Rate Only
E13-148		1,5 mm² 24-pair o/all scr	m	1	533.70		Rate Only
E13-149		1,5 mm² 24-pair ind scr, o/all scr	m	1	699.20		Rate Only
E13-150		CAT6E Network Cable	m	20	91.05	R	1,821.04
E13-151		2.5mm² x 3 core	m	470	56.24	R	26,431.86
		Carried forward / ...				R	24,604,678.54

		Brought forward / ...				R	24,604,678.54
E13-152		16mm² x 1 core Insulated Earth wire	m	470	47.67	R	22,404.15
		Cable terminations for instrument multicore cables, complete, including gland shroud, lugs, tag numbers, etc and connection.					
		Inlet Works					
E13-153		1,5 mm² 1-pair scr	No	1	471.45		Rate Only
E13-154		1,5 mm² 2-pair o/all scr	No	295	503.16	R	148,431.03
E13-155		1,5 mm² 2-pair ind scr, o/all scr	No	1	503.16		Rate Only
E13-156		1,5 mm² 4-pair o/all scr	No	1	526.39		Rate Only
E13-157		1,5 mm² 4-pair ind scr, o/all scr	No	1	526.39		Rate Only
E13-158		1,5 mm² 8-pair o/all scr	No	100	282.69	R	28,268.97
E13-159		1,5 mm² 8-pair ind scr, o/all scr	No	1	282.69		Rate Only
E13-160		1,5 mm² 12-pair o/all scr	No	1	392.35		Rate Only
E13-161		1,5 mm² 12-pair ind scr, o/all scr	No	1	392.35		Rate Only
E13-162		1,5 mm² 24-pair o/all scr	No	1	708.34		Rate Only
E13-163		1,5 mm² 24-pair ind scr, o/all scr	No	1	708.34		Rate Only
E13-164		CAT6E Network Cable	No	12	471.45	R	5,657.38
E13-165		2.5mm² x 3 core	No	62	180.83	R	11,211.58
E13-166		16mm² x 1 core Insulated Earth wire	No	62	314.93	R	19,525.83
		Bioreactor					
E13-167		1,5 mm² 1-pair scr	No	1	471.45		Rate Only
E13-168		1,5 mm² 2-pair o/all scr	No	264	503.16	R	132,833.19
E13-169		1,5 mm² 2-pair ind scr, o/all scr	No	1	503.16		Rate Only
E13-170		1,5 mm² 4-pair o/all scr	No	1	526.39		Rate Only
E13-171		1,5 mm² 4-pair ind scr, o/all scr	No	1	526.39		Rate Only
E13-172		1,5 mm² 8-pair o/all scr	No	135	282.69	R	38,163.11
E13-173		1,5 mm² 8-pair ind scr, o/all scr	No	1	282.69		Rate Only
E13-174		1,5 mm² 12-pair o/all scr	No	1	392.35		Rate Only
E13-175		1,5 mm² 12-pair ind scr, o/all scr	No	1	392.35		Rate Only
		Carried forward / ...				R	25,011,173.78

		Brought forward / ...				R	25,011,173.78
E13-176		1,5 mm² 24-pair o/all scr	No	1	708.34		Rate Only
E13-177		1,5 mm² 24-pair ind scr, o/all scr	No	1	708.34		Rate Only
E13-178		CAT6E Network Cable	m	6	471.45	R	2,828.69
E13-179		2.5mm² x 3 core	No	102	180.83	R	18,444.86
E13-180		16mm² x 1 core Insulated Earth wire	No	102	314.93	R	32,123.15
		Primary Settling					
E13-181		1,5 mm² 1-pair scr	No	1	471.45		Rate Only
E13-182		1,5 mm² 2-pair o/all scr	No	70	503.16	R	35,220.92
E13-183		1,5 mm² 2-pair ind scr, o/all scr	No	1	503.16		Rate Only
E13-184		1,5 mm² 4-pair o/all scr	No	1	526.39		Rate Only
E13-185		1,5 mm² 4-pair ind scr, o/all scr	No	1	526.39		Rate Only
E13-186		1,5 mm² 8-pair o/all scr	No	12	282.69	R	3,392.28
E13-187		1,5 mm² 8-pair ind scr, o/all scr	No	1	282.69		Rate Only
E13-188		1,5 mm² 12-pair o/all scr	No	1	392.35		Rate Only
E13-189		1,5 mm² 12-pair ind scr, o/all scr	No	1	392.35		Rate Only
E13-190		1,5 mm² 24-pair o/all scr	No	1	708.34		Rate Only
E13-191		1,5 mm² 24-pair ind scr, o/all scr	No	1	708.34		Rate Only
E13-192		CAT6E Network Cable	m	1	471.45		Rate Only
E13-193		2.5mm² x 3 core	No	12	180.83	R	2,169.98
E13-194		16mm² x 1 core Insulated Earth wire	No	12	314.93	R	3,779.19
		Secondary Settling					
E13-195		1,5 mm² 1-pair scr	No	1	471.45		Rate Only
E13-196		1,5 mm² 2-pair o/all scr	No	242	503.16	R	121,763.76
E13-197		1,5 mm² 2-pair ind scr, o/all scr	No	1	503.16		Rate Only
E13-198		1,5 mm² 4-pair o/all scr	No	1	526.39		Rate Only
E13-199		1,5 mm² 4-pair ind scr, o/all scr	No	1	526.39		Rate Only
E13-200		1,5 mm² 8-pair o/all scr	No	36	282.69	R	10,176.83
E13-201		1,5 mm² 8-pair ind scr, o/all scr	No	1	282.69		Rate Only
		Carried forward / ...				R	25,241,073.44

		Brought forward / ...				R	25,241,073.44
E13-202		1,5 mm² 12-pair o/all scr	No	1	392.35		Rate Only
E13-203		1,5 mm² 12-pair ind scr, o/all scr	No	1	392.35		Rate Only
E13-204		1,5 mm² 24-pair o/all scr	No	1	708.34		Rate Only
E13-205		1,5 mm² 24-pair ind scr, o/all scr	No	1	708.34		Rate Only
E13-206		CAT6E Network Cable	m	40	471.45	R	18,857.94
E13-207		2.5mm² x 3 core	No	68	180.83	R	12,296.57
E13-208		16mm² x 1 core Insulated Earth wire	No	68	314.93	R	21,415.43
		Dewatering					
E13-209		1,5 mm² 1-pair scr	No	1	471.45		Rate Only
E13-210		1,5 mm² 2-pair o/all scr	No	666	503.16	R	335,101.92
E13-211		1,5 mm² 2-pair ind scr, o/all scr	No	1	503.16		Rate Only
E13-212		1,5 mm² 4-pair o/all scr	No	1	526.39		Rate Only
E13-213		1,5 mm² 4-pair ind scr, o/all scr	No	1	526.39		Rate Only
E13-214		1,5 mm² 8-pair o/all scr	No	166	282.69	R	46,926.49
E13-215		1,5 mm² 8-pair ind scr, o/all scr	No	1	282.69		Rate Only
E13-216		1,5 mm² 12-pair o/all scr	No	1	392.35		Rate Only
E13-217		1,5 mm² 12-pair ind scr, o/all scr	No	1	392.35		Rate Only
E13-218		1,5 mm² 24-pair o/all scr	No	1	708.34		Rate Only
E13-219		1,5 mm² 24-pair ind scr, o/all scr	No	1	708.34		Rate Only
E13-220		CAT6E Network Cable	m	61	503.16	R	30,692.52
E13-221		2.5mm² x 3 core	No	61	180.83	R	11,030.75
E13-222		16mm² x 1 core Insulated Earth wire	No	45	314.93	R	14,171.98
		Primary Sludge					
E13-223		1,5 mm² 1-pair scr	No	1	471.45		Rate Only
E13-224		1,5 mm² 2-pair o/all scr	No	162	503.16	R	81,511.28
E13-225		1,5 mm² 2-pair ind scr, o/all scr	No	1	503.16		Rate Only
E13-226		1,5 mm² 4-pair o/all scr	No	1	526.39		Rate Only
E13-227		1,5 mm² 4-pair ind scr, o/all scr	No	1	526.39		Rate Only
		Carried forward / ...				R	25,813,078.31

		Brought forward / ...				R	25,813,078.31
E13-228		1,5 mm² 8-pair o/all scr	No	84	282.69	R	23,745.93
E13-229		1,5 mm² 8-pair ind scr, o/all scr	No	1	282.69		Rate Only
E13-230		1,5 mm² 12-pair o/all scr	No	1	392.35		Rate Only
E13-231		1,5 mm² 12-pair ind scr, o/all scr	No	1	392.35		Rate Only
E13-232		1,5 mm² 24-pair o/all scr	No	1	708.34		Rate Only
E13-233		1,5 mm² 24-pair ind scr, o/all scr	No	1	708.34		Rate Only
E13-234		CAT6E Network Cable	m	12	503.16	R	6,037.87
E13-235		2.5mm² x 3 core	No	120	180.83	R	21,699.83
E13-236		16mm² x 1 core Insulated Earth wire	No	120	314.93	R	37,791.94
		Waste Activated Sludge					
E13-237		1,5 mm² 1-pair scr	No	1	471.45		Rate Only
E13-238		1,5 mm² 2-pair o/all scr	No	600	503.16	R	301,893.62
E13-239		1,5 mm² 2-pair ind scr, o/all scr	No	1	503.16		Rate Only
E13-240		1,5 mm² 4-pair o/all scr	No	1	526.39		Rate Only
E13-241		1,5 mm² 4-pair ind scr, o/all scr	No	1	526.39		Rate Only
E13-242		1,5 mm² 8-pair o/all scr	No	140	282.69	R	39,576.56
E13-243		1,5 mm² 8-pair ind scr, o/all scr	No	1	282.69		Rate Only
E13-244		1,5 mm² 12-pair o/all scr	No	1	392.35		Rate Only
E13-245		1,5 mm² 12-pair ind scr, o/all scr	No	1	392.35		Rate Only
E13-246		1,5 mm² 24-pair o/all scr	No	1	708.34		Rate Only
E13-247		1,5 mm² 24-pair ind scr, o/all scr	No	1	708.34		Rate Only
E13-248		CAT6E Network Cable	m	30	503.16	R	15,094.68
E13-249		2.5mm² x 3 core	No	30	180.83	R	5,424.96
E13-250		16mm² x 1 core Insulated Earth wire	No	30	314.93	R	9,447.98
		Ultra Violet Filtration					
E13-251		1,5 mm² 1-pair scr	No	1	471.45		Rate Only
E13-252		1,5 mm² 2-pair o/all scr	No	70	503.16	R	35,220.92
E13-253		1,5 mm² 2-pair ind scr, o/all scr	No	1	503.16		Rate Only
		Carried forward / ...				R	26,309,012.60

		Brought forward / ...				R	26,309,012.60
E13-254		1,5 mm² 4-pair o/all scr	No	1	526.39		Rate Only
E13-255		1,5 mm² 4-pair ind scr, o/all scr	No	1	526.39		Rate Only
E13-256		1,5 mm² 8-pair o/all scr	No	80	282.69	R	22,615.17
E13-257		1,5 mm² 8-pair ind scr, o/all scr	No	1	282.69		Rate Only
E13-258		1,5 mm² 12-pair o/all scr	No	1	392.35		Rate Only
E13-259		1,5 mm² 12-pair ind scr, o/all scr	No	1	392.35		Rate Only
E13-260		1,5 mm² 24-pair o/all scr	No	1	708.34		Rate Only
E13-261		1,5 mm² 24-pair ind scr, o/all scr	No	1	708.34		Rate Only
E13-262		CAT6E Network Cable	m	24	471.45	R	11,314.76
E13-263		2.5mm² x 3 core	No	20	180.83	R	3,616.64
E13-264		16mm² x 1 core Insulated Earth wire	No	20	314.93	R	6,298.66
		Service Water					
E13-265		1,5 mm² 1-pair scr	No	1	471.45		Rate Only
E13-266		1,5 mm² 2-pair o/all scr	No	160	503.16	R	80,504.96
E13-267		1,5 mm² 2-pair ind scr, o/all scr	No	1	503.16		Rate Only
E13-268		1,5 mm² 4-pair o/all scr	No	1	526.39		Rate Only
E13-269		1,5 mm² 4-pair ind scr, o/all scr	No	1	526.39		Rate Only
E13-270		1,5 mm² 8-pair o/all scr	No	8	282.69	R	2,261.52
E13-271		1,5 mm² 8-pair ind scr, o/all scr	No	1	282.69		Rate Only
E13-272		1,5 mm² 12-pair o/all scr	No	1	392.35		Rate Only
E13-273		1,5 mm² 12-pair ind scr, o/all scr	No	1	392.35		Rate Only
E13-274		1,5 mm² 24-pair o/all scr	No	1	708.34		Rate Only
E13-275		1,5 mm² 24-pair ind scr, o/all scr	No	1	708.34		Rate Only
E13-276		CAT6E Network Cable	m	42	503.16	R	21,132.55
E13-277		2.5mm² x 3 core	No	50	180.83	R	9,041.60
E13-278		16mm² x 1 core Insulated Earth wire	No	50	314.93	R	15,746.64
		TSE Pump station					
E13-279		1,5 mm² 1-pair scr	No	1	471.45		Rate Only
		Carried forward / ...				R	26,481,545.11

		Brought forward / ...				R	26,481,545.11
E13-280		1,5 mm² 2-pair o/all scr	No	58	503.16	R	29,183.05
E13-281		1,5 mm² 2-pair ind scr, o/all scr	No	1	503.16		Rate Only
E13-282		1,5 mm² 4-pair o/all scr	No	1	526.39		Rate Only
E13-283		1,5 mm² 4-pair ind scr, o/all scr	No	1	526.39		Rate Only
E13-284		1,5 mm² 8-pair o/all scr	No	8	282.69	R	2,261.52
E13-285		1,5 mm² 8-pair ind scr, o/all scr	No	1	282.69		Rate Only
E13-286		1,5 mm² 12-pair o/all scr	No	1	392.35		Rate Only
E13-287		1,5 mm² 12-pair ind scr, o/all scr	No	1	392.35		Rate Only
E13-288		1,5 mm² 24-pair o/all scr	No	1	708.34		Rate Only
E13-289		1,5 mm² 24-pair ind scr, o/all scr	No	1	708.34		Rate Only
E13-290		CAT6E Network Cable	No	1	471.45	R	471.45
E13-291		2.5mm² x 3 core	No	20	180.83	R	3,616.64
E13-292		16mm² x 1 core Insulated Earth wire	No	20	314.93	R	6,298.66
		Allow for all costs and expenses in connection with the site installation of the following:					
		Inlet Works					
E13-293		1,5 mm² 1-pair scr	m	1	9.19		Rate Only
E13-294		1,5 mm² 2-pair o/all scr	m	2 500	9.54	R	23,861.67
E13-295		1,5 mm² 2-pair ind scr, o/all scr	m	1	10.50		Rate Only
E13-296		1,5 mm² 4-pair o/all scr	m	1	11.81		Rate Only
E13-297		1,5 mm² 4-pair ind scr, o/all scr	m	1	11.81		Rate Only
E13-298		1,5 mm² 8-pair o/all scr	m	15 500	13.12	R	203,420.71
E13-299		1,5 mm² 8-pair ind scr, o/all scr	m	1	14.44		Rate Only
E13-300		1,5 mm² 12-pair o/all scr	m	1 000	14.32	R	14,317.00
E13-301		1,5 mm² 12-pair ind scr, o/all scr	m	1	15.75		Rate Only
E13-302		1,5 mm² 24-pair o/all scr	m	1	23.62		Rate Only
E13-303		1,5 mm² 24-pair ind scr, o/all scr	m	1	23.62		Rate Only
E13-304		CAT6E Network Cable	m	150	15.51	R	2,326.51
		Carried forward / ...				R	26,767,302.31

		Brought forward / ...				R	26,767,302.31
E13-305		2.5mm² x 3 core	m	3 220	11.93	R	38,417.28
E13-306		16mm² x 1 core Insulated Earth wire	m	3 220	10.74	R	34,575.56
		Bioreactor					
E13-307		1,5 mm² 1-pair scr	m	1	9.19		Rate Only
E13-308		1,5 mm² 2-pair o/all scr	m	13 000	9.54	R	124,080.67
E13-309		1,5 mm² 2-pair ind scr, o/all scr	m	1 560	9.54	R	14,889.68
E13-310		1,5 mm² 4-pair o/all scr	m	1	11.81		Rate Only
E13-311		1,5 mm² 4-pair ind scr, o/all scr	m	1	11.81		Rate Only
E13-312		1,5 mm² 8-pair o/all scr	m	13 500	13.12	R	177,172.88
E13-313		1,5 mm² 8-pair ind scr, o/all scr	m	1	14.44		Rate Only
E13-314		1,5 mm² 12-pair o/all scr	m	1	15.75		Rate Only
E13-315		1,5 mm² 12-pair ind scr, o/all scr	m	1	15.75		Rate Only
E13-316		1,5 mm² 24-pair o/all scr	m	1	23.62		Rate Only
E13-317		1,5 mm² 24-pair ind scr, o/all scr	m	1	23.62		Rate Only
E13-318		CAT6E Network Cable	m	40	15.51	R	620.40
E13-319		2.5mm² x 3 core	m	5 710	11.93	R	68,125.06
E13-320		16mm² x 1 core Insulated Earth wire	m	5 710	10.74	R	61,312.55
		Primary Settling					
E13-321		1,5 mm² 1-pair scr	m	1	9.19		Rate Only
E13-322		1,5 mm² 2-pair o/all scr	m	2 700	9.54	R	25,770.60
E13-323		1,5 mm² 2-pair ind scr, o/all scr	m	1	10.50		Rate Only
E13-324		1,5 mm² 4-pair o/all scr	m	1	11.81		Rate Only
E13-325		1,5 mm² 4-pair ind scr, o/all scr	m	1	11.81		Rate Only
E13-326		1,5 mm² 8-pair o/all scr	m	2 000	13.12	R	26,247.83
E13-327		1,5 mm² 8-pair ind scr, o/all scr	m	1	14.44		Rate Only
E13-328		1,5 mm² 12-pair o/all scr	m	1	15.75		Rate Only
E13-329		1,5 mm² 12-pair ind scr, o/all scr	m	1	15.75		Rate Only
E13-330		1,5 mm² 24-pair o/all scr	m	1	23.62		Rate Only
		Carried forward / ...				R	27,338,514.81

		Brought forward / ...				R	27,338,514.81
E13-331		1,5 mm² 24-pair ind scr, o/all scr	m	1	23.62		Rate Only
E13-332		CAT6E Network Cable	m	1	17.06		Rate Only
E13-333		2.5mm² x 3 core	m	1 400	11.93	R	16,703.17
E13-334		16mm² x 1 core Insulated Earth wire	m	1 400	10.74	R	15,032.85
		Secondary Settling					
E13-335		1,5 mm² 1-pair scr	m	1	9.19		Rate Only
E13-336		1,5 mm² 2-pair o/all scr	m	9 500	9.54	R	90,674.33
E13-337		1,5 mm² 2-pair ind scr, o/all scr	m	1	10.50		Rate Only
E13-338		1,5 mm² 4-pair o/all scr	m	1	11.81		Rate Only
E13-339		1,5 mm² 4-pair ind scr, o/all scr	m	1	11.81		Rate Only
E13-340		1,5 mm² 8-pair o/all scr	m	6 000	13.12	R	78,743.50
E13-341		1,5 mm² 8-pair ind scr, o/all scr	m	1	14.44		Rate Only
E13-342		1,5 mm² 12-pair o/all scr	m	1	15.75		Rate Only
E13-343		1,5 mm² 12-pair ind scr, o/all scr	m	1	15.75		Rate Only
E13-344		1,5 mm² 24-pair o/all scr	m	1	23.62		Rate Only
E13-345		1,5 mm² 24-pair ind scr, o/all scr	m	1	23.62		Rate Only
E13-346		CAT6E Network Cable	m	1	17.06		Rate Only
E13-347		2.5mm² x 3 core	m	11 000	11.93	R	131,239.17
E13-348		16mm² x 1 core Insulated Earth wire	m	11 000	10.74	R	118,115.25
		Blowers					
E13-349		1,5 mm² 1-pair scr	m	1	9.19		Rate Only
E13-350		1,5 mm² 2-pair o/all scr	m	1	10.50		Rate Only
E13-351		1,5 mm² 2-pair ind scr, o/all scr	m	1	10.50		Rate Only
E13-352		1,5 mm² 4-pair o/all scr	m	1	11.81		Rate Only
E13-353		1,5 mm² 4-pair ind scr, o/all scr	m	1	11.81		Rate Only
E13-354		1,5 mm² 8-pair o/all scr	m	1	14.44		Rate Only
E13-355		1,5 mm² 8-pair ind scr, o/all scr	m	1	14.44		Rate Only
E13-356		1,5 mm² 12-pair o/all scr	m	1			Rate Only
		Carried forward / ...				R	27,789,023.08

		Brought forward / ...				R	27,789,023.08
E13-357		1,5 mm² 12-pair ind scr, o/all scr	m	1	15.75		Rate Only
E13-358		1,5 mm² 24-pair o/all scr	m	1	23.62		Rate Only
E13-359		1,5 mm² 24-pair ind scr, o/all scr	m	1	23.62		Rate Only
E13-360		CAT6E Network Cable	m	400	15.51	R	6,204.03
E13-361		2.5mm² x 3 core	m	400	11.93	R	4,772.33
E13-362		16mm² x 1 core Insulated Earth wire	m	400	10.74	R	4,295.10
		Dewatering					
E13-363		1,5 mm² 1-pair scr	m	1	9.19		Rate Only
E13-364		1,5 mm² 2-pair o/all scr	m	16 950	9.54	R	161,782.10
E13-365		1,5 mm² 2-pair ind scr, o/all scr	m	450	9.54	R	4,295.10
E13-366		1,5 mm² 4-pair o/all scr	m	1	11.81		Rate Only
E13-367		1,5 mm² 4-pair ind scr, o/all scr	m	1	11.81		Rate Only
E13-368		1,5 mm² 8-pair o/all scr	m	16 850	13.12	R	221,138.00
E13-369		1,5 mm² 8-pair ind scr, o/all scr	m	1	14.44		Rate Only
E13-370		1,5 mm² 12-pair o/all scr	m	1	15.75		Rate Only
E13-371		1,5 mm² 12-pair ind scr, o/all scr	m	1	15.75		Rate Only
E13-372		1,5 mm² 24-pair o/all scr	m	1	23.62		Rate Only
E13-373		1,5 mm² 24-pair ind scr, o/all scr	m	1	23.62		Rate Only
E13-374		CAT6E Network Cable	m	850	15.51	R	13,183.57
E13-375		2.5mm² x 3 core	m	14 250	11.93	R	170,014.38
E13-376		16mm² x 1 core Insulated Earth wire	m	14 000	10.74	R	150,328.50
		Primary Sludge					
E13-377		1,5 mm² 1-pair scr	m	1	9.19		Rate Only
E13-378		1,5 mm² 2-pair o/all scr	m	5 000	9.54	R	47,723.33
E13-379		1,5 mm² 2-pair ind scr, o/all scr	m	40	9.54	R	381.79
E13-380		1,5 mm² 4-pair o/all scr	m	1	11.81		Rate Only
E13-381		1,5 mm² 4-pair ind scr, o/all scr	m	1	11.81		Rate Only
E13-382		1,5 mm² 8-pair o/all scr	m	5 500	13.12	R	72,181.54
		Carried forward / ...				R	28,645,322.85

		Brought forward / ...				R	28,645,322.85
E13-383		1,5 mm² 8-pair ind scr, o/all scr	m	1	14.44		Rate Only
E13-384		1,5 mm² 12-pair o/all scr	m	1	15.75		Rate Only
E13-385		1,5 mm² 12-pair ind scr, o/all scr	m	1	15.75		Rate Only
E13-386		1,5 mm² 24-pair o/all scr	m	1	23.62		Rate Only
E13-387		1,5 mm² 24-pair ind scr, o/all scr	m	1	23.62		Rate Only
E13-388		CAT6E Network Cable	m	150	15.51	R	2,326.51
E13-389		2.5mm² x 3 core	m	2 400	11.93	R	28,634.00
E13-390		16mm² x 1 core Insulated Earth wire	m	2 400	10.74	R	25,770.60
		Waste Activated Sludge					
E13-391		1,5 mm² 1-pair scr	m	1	9.19		Rate Only
E13-392		1,5 mm² 2-pair o/all scr	m	15 000	9.54	R	143,170.00
E13-393		1,5 mm² 2-pair ind scr, o/all scr	m	300	9.54	R	2,863.40
E13-394		1,5 mm² 4-pair o/all scr	m	1	11.81		Rate Only
E13-395		1,5 mm² 4-pair ind scr, o/all scr	m	1	11.81		Rate Only
E13-396		1,5 mm² 8-pair o/all scr	m	15 000	13.12	R	196,858.75
E13-397		1,5 mm² 8-pair ind scr, o/all scr	m	1	14.44		Rate Only
E13-398		1,5 mm² 12-pair o/all scr	m	1	15.75		Rate Only
E13-399		1,5 mm² 12-pair ind scr, o/all scr	m	1	15.75		Rate Only
E13-400		1,5 mm² 24-pair o/all scr	m	1	23.62		Rate Only
E13-401		1,5 mm² 24-pair ind scr, o/all scr	m	1	23.62		Rate Only
E13-402		CAT6E Network Cable	m	450	15.51	R	6,979.54
E13-403		2.5mm² x 3 core	m	8 500	11.93	R	101,412.08
E13-404		16mm² x 1 core Insulated Earth wire	m	8 500	10.74	R	91,270.88
		Ultra Violet Filtration					
E13-405		1,5 mm² 1-pair scr	m	1	9.19		Rate Only
E13-406		1,5 mm² 2-pair o/all scr	m	700	9.54	R	6,681.27
E13-407		1,5 mm² 2-pair ind scr, o/all scr	m	1	10.50		Rate Only
E13-408		1,5 mm² 4-pair o/all scr	m	1	11.81		Rate Only
		Carried forward / ...				R	29,251,289.88

		Brought forward / ...				R	29,251,289.88
E13-409		1,5 mm² 4-pair ind scr, o/all scr	m	1	11.81		Rate Only
E13-410		1,5 mm² 8-pair o/all scr	m	7 500	13.12	R	98,429.38
E13-411		1,5 mm² 8-pair ind scr, o/all scr	m	1	14.44		Rate Only
E13-412		1,5 mm² 12-pair o/all scr	m	1	15.75		Rate Only
E13-413		1,5 mm² 12-pair ind scr, o/all scr	m	1	15.75		Rate Only
E13-414		1,5 mm² 24-pair o/all scr	m	1	23.62		Rate Only
E13-415		1,5 mm² 24-pair ind scr, o/all scr	m	1	23.62		Rate Only
E13-416		CAT6E Network Cable	m	700	15.51	R	10,857.06
E13-417		2.5mm² x 3 core	m	3 500	11.93	R	41,757.92
E13-418		16mm² x 1 core Insulated Earth wire	m	3 500	10.74	R	37,582.13
		Service Water					
E13-419		1,5 mm² 1-pair scr	m	1	9.19		Rate Only
E13-420		1,5 mm² 2-pair o/all scr	m	3 500	9.54	R	33,406.33
E13-421		1,5 mm² 2-pair ind scr, o/all scr	m	200	9.54	R	1,908.93
E13-422		1,5 mm² 4-pair o/all scr	m	1	11.81		Rate Only
E13-423		1,5 mm² 4-pair ind scr, o/all scr	m	1	11.81		Rate Only
E13-424		1,5 mm² 8-pair o/all scr	m	800	13.12	R	10,499.13
E13-425		1,5 mm² 8-pair ind scr, o/all scr	m	1	14.44		Rate Only
E13-426		1,5 mm² 12-pair o/all scr	m	1	15.75		Rate Only
E13-427		1,5 mm² 12-pair ind scr, o/all scr	m	1	15.75		Rate Only
E13-428		1,5 mm² 24-pair o/all scr	m	1	23.62		Rate Only
E13-429		1,5 mm² 24-pair ind scr, o/all scr	m	1	23.62		Rate Only
E13-430		CAT6E Network Cable	m	500	15.51	R	7,755.04
E13-431		2.5mm² x 3 core	m	5 500	11.93	R	65,619.58
E13-432		16mm² x 1 core Insulated Earth wire	m	5 500	10.74	R	59,057.63
		TSE Pump station					
E13-433		1,5 mm² 1-pair scr	m	1	9.19		Rate Only
E13-434		1,5 mm² 2-pair o/all scr	m	1 160	9.54	R	11,071.81
		Carried forward / ...				R	29,629,234.81

		Brought forward / ...				R	29,629,234.81
E13-435		1,5 mm² 2-pair ind scr, o/all scr	m	723	9.54	R	6,900.79
E13-436		1,5 mm² 4-pair o/all scr	m	1	11.81		Rate Only
E13-437		1,5 mm² 4-pair ind scr, o/all scr	m	1	11.81		Rate Only
E13-438		1,5 mm² 8-pair o/all scr	m	350	13.12	R	4,593.37
E13-439		1,5 mm² 8-pair ind scr, o/all scr	m	1	14.44		Rate Only
E13-440		1,5 mm² 12-pair o/all scr	m	1	15.75		Rate Only
E13-441		1,5 mm² 12-pair ind scr, o/all scr	m	1	15.75		Rate Only
E13-442		1,5 mm² 24-pair o/all scr	m	1	23.62		Rate Only
E13-443		1,5 mm² 24-pair ind scr, o/all scr	m	1	23.62		Rate Only
E13-444		CAT6E Network Cable	m	20	15.51	R	310.20
E13-445		2.5mm² x 3 core	m	470	11.93	R	5,607.49
E13-446		16mm² x 1 core Insulated Earth wire	m	470	10.74	R	5,046.74
		Cable terminations for instrument multicore cables, complete, including gland shroud, lugs, tag numbers, etc and connection.					
		Inlet Works					
E13-153		1,5 mm² 1-pair scr	No	1	220.48		Rate Only
E13-154		1,5 mm² 2-pair o/all scr	No	295	200.44	R	59,129.21
E13-155		1,5 mm² 2-pair ind scr, o/all scr	No	1	220.48		Rate Only
E13-156		1,5 mm² 4-pair o/all scr	No	1	264.58		Rate Only
E13-157		1,5 mm² 4-pair ind scr, o/all scr	No	1	264.58		Rate Only
E13-158		1,5 mm² 8-pair o/all scr	No	100	202.82	R	20,282.42
E13-159		1,5 mm² 8-pair ind scr, o/all scr	No	1	223.11		Rate Only
E13-160		1,5 mm² 12-pair o/all scr	No	1	275.60		Rate Only
E13-161		1,5 mm² 12-pair ind scr, o/all scr	No	1	275.60		Rate Only
E13-162		1,5 mm² 24-pair o/all scr	No	1	275.60		Rate Only
E13-163		1,5 mm² 24-pair ind scr, o/all scr	No	1	275.60		Rate Only
E13-164		CAT6E Network Cable	No	12	131.24	R	1,574.87
E13-165		2.5mm² x 3 core	No	62	116.92	R	7,249.17
		Carried forward / ...				R	29,739,929.09

		Brought forward / ...				R	29,739,929.09
E13-166		16mm² x 1 core Insulated Earth wire	No	62	77.55	R	4,808.13
		Bioreactor					
E13-167		1,5 mm² 1-pair scr	No	1	220.48		Rate Only
E13-168		1,5 mm² 2-pair o/all scr	No	264	200.44	R	52,915.63
E13-169		1,5 mm² 2-pair ind scr, o/all scr	No	1	220.48		Rate Only
E13-170		1,5 mm² 4-pair o/all scr	No	1	264.58		Rate Only
E13-171		1,5 mm² 4-pair ind scr, o/all scr	No	1	264.58		Rate Only
E13-172		1,5 mm² 8-pair o/all scr	No	135	202.82	R	27,381.26
E13-173		1,5 mm² 8-pair ind scr, o/all scr	No	1	223.11		Rate Only
E13-174		1,5 mm² 12-pair o/all scr	No	1	275.60		Rate Only
E13-175		1,5 mm² 12-pair ind scr, o/all scr	No	1	275.60		Rate Only
E13-176		1,5 mm² 24-pair o/all scr	No	1	275.60		Rate Only
E13-177		1,5 mm² 24-pair ind scr, o/all scr	No	1	275.60		Rate Only
E13-178		CAT6E Network Cable	m	6	131.24	R	787.44
E13-179		2.5mm² x 3 core	No	102	116.92	R	11,926.06
E13-180		16mm² x 1 core Insulated Earth wire	No	102	77.55	R	7,910.14
		Primary Settling					
E13-181		1,5 mm² 1-pair scr	No	1	220.48		Rate Only
E13-182		1,5 mm² 2-pair o/all scr	No	70	200.44	R	14,030.66
E13-183		1,5 mm² 2-pair ind scr, o/all scr	No	1	220.48		Rate Only
E13-184		1,5 mm² 4-pair o/all scr	No	1	264.58		Rate Only
E13-185		1,5 mm² 4-pair ind scr, o/all scr	No	1	264.58		Rate Only
E13-186		1,5 mm² 8-pair o/all scr	No	12	202.82	R	2,433.89
E13-187		1,5 mm² 8-pair ind scr, o/all scr	No	1	223.11		Rate Only
E13-188		1,5 mm² 12-pair o/all scr	No	1	275.60		Rate Only
E13-189		1,5 mm² 12-pair ind scr, o/all scr	No	1	275.60		Rate Only
E13-190		1,5 mm² 24-pair o/all scr	No	1	275.60		Rate Only
E13-191		1,5 mm² 24-pair ind scr, o/all scr	No	1	275.60		Rate Only
E13-192		CAT6E Network Cable	m	1	144.36		Rate Only
		Carried forward / ...				R	29,862,122.29

		Brought forward / ...				R	29,862,122.29
		Secondary Settling					
E13-195		1,5 mm² 1-pair scr	No	1	220.48		Rate Only
E13-196		1,5 mm² 2-pair o/all scr	No	242	200.44	R	48,506.00
E13-197		1,5 mm² 2-pair ind scr, o/all scr	No	1	220.48		Rate Only
E13-198		1,5 mm² 4-pair o/all scr	No	1	264.58		Rate Only
E13-199		1,5 mm² 4-pair ind scr, o/all scr	No	1	264.58		Rate Only
E13-200		1,5 mm² 8-pair o/all scr	No	36	202.82	R	7,301.67
E13-201		1,5 mm² 8-pair ind scr, o/all scr	No	1	223.11		Rate Only
E13-202		1,5 mm² 12-pair o/all scr	No	1	275.60		Rate Only
E13-203		1,5 mm² 12-pair ind scr, o/all scr	No	1	275.60		Rate Only
E13-204		1,5 mm² 24-pair o/all scr	No	1	275.60		Rate Only
E13-205		1,5 mm² 24-pair ind scr, o/all scr	No	1	275.60		Rate Only
E13-206		CAT6E Network Cable	m	40	131.24	R	5,249.57
E13-207		2.5mm² x 3 core	No	68	116.92	R	7,950.71
E13-208		16mm² x 1 core Insulated Earth wire	No	68	77.55	R	5,273.43
		Dewatering					
E13-209		1,5 mm² 1-pair scr	No	1	220.48		Rate Only
E13-210		1,5 mm² 2-pair o/all scr	No	650	200.44	R	130,284.70
E13-211		1,5 mm² 2-pair ind scr, o/all scr	No	1	220.48		Rate Only
E13-212		1,5 mm² 4-pair o/all scr	No	1	264.58		Rate Only
E13-213		1,5 mm² 4-pair ind scr, o/all scr	No	1	264.58		Rate Only
E13-214		1,5 mm² 8-pair o/all scr	No	160	202.82	R	32,451.87
E13-215		1,5 mm² 8-pair ind scr, o/all scr	No	1	223.11		Rate Only
E13-216		1,5 mm² 12-pair o/all scr	No	1	275.60		Rate Only
E13-217		1,5 mm² 12-pair ind scr, o/all scr	No	1	275.60		Rate Only
E13-218		1,5 mm² 24-pair o/all scr	No	1	275.60		Rate Only
E13-219		1,5 mm² 24-pair ind scr, o/all scr	No	1	275.60		Rate Only
		Carried forward / ...				R	30,099,140.23

		Brought forward / ...				R	30,099,140.23
E13-220		CAT6E Network Cable	m	45	131.24	R	5,905.76
E13-221		2.5mm² x 3 core	No	45	116.92	R	5,261.50
E13-222		16mm² x 1 core Insulated Earth wire	No	45	77.55	R	3,489.77
		Primary Sludge					
E13-223		1,5 mm² 1-pair scr	No	1	220.48		Rate Only
E13-224		1,5 mm² 2-pair o/all scr	No	162	200.44	R	32,470.96
E13-225		1,5 mm² 2-pair ind scr, o/all scr	No	1	220.48		Rate Only
E13-226		1,5 mm² 4-pair o/all scr	No	1	264.58		Rate Only
E13-227		1,5 mm² 4-pair ind scr, o/all scr	No	1	264.58		Rate Only
E13-228		1,5 mm² 8-pair o/all scr	No	84	202.82	R	17,037.23
E13-229		1,5 mm² 8-pair ind scr, o/all scr	No	1	223.11		Rate Only
E13-230		1,5 mm² 12-pair o/all scr	No	1	275.60		Rate Only
E13-231		1,5 mm² 12-pair ind scr, o/all scr	No	1	275.60		Rate Only
E13-232		1,5 mm² 24-pair o/all scr	No	1	275.60		Rate Only
E13-233		1,5 mm² 24-pair ind scr, o/all scr	No	1	275.60		Rate Only
E13-234		CAT6E Network Cable	m	12	131.24	R	1,574.87
E13-235		2.5mm² x 3 core	No	120	116.92	R	14,030.66
E13-236		16mm² x 1 core Insulated Earth wire	No	120	77.55	R	9,306.05
		Waste Activated Sludge					
E13-237		1,5 mm² 1-pair scr	No	1	220.48		Rate Only
E13-238		1,5 mm² 2-pair o/all scr	No	600	200.44	R	120,262.80
E13-239		1,5 mm² 2-pair ind scr, o/all scr	No	1	220.48		Rate Only
E13-240		1,5 mm² 4-pair o/all scr	No	1	264.58		Rate Only
E13-241		1,5 mm² 4-pair ind scr, o/all scr	No	1	264.58		Rate Only
E13-242		1,5 mm² 8-pair o/all scr	No	140	202.82		Rate Only
E13-243		1,5 mm² 8-pair ind scr, o/all scr	No	1	223.11		Rate Only
E13-244		1,5 mm² 12-pair o/all scr	No	1	275.60		Rate Only
E13-245		1,5 mm² 12-pair ind scr, o/all scr	No	1	275.60		Rate Only
E13-246		1,5 mm² 24-pair o/all scr	No	1	275.60		Rate Only
		Carried forward / ...				R	30,308,479.82

		Brought forward / ...				R	30,308,479.82
E13-247		1,5 mm² 24-pair ind scr, o/all scr	No	1	275.60		Rate Only
E13-248		CAT6E Network Cable	m	30	131.24	R	3,937.18
E13-249		2.5mm² x 3 core	No	30	116.92	R	3,507.67
E13-250		16mm² x 1 core Insulated Earth wire	No	30	77.55	R	2,326.51
		Ultra Violet Filtration					
E13-251		1,5 mm² 1-pair scr	No	1	220.48		Rate Only
E13-252		1,5 mm² 2-pair o/all scr	No	70	200.44	R	14,030.66
E13-253		1,5 mm² 2-pair ind scr, o/all scr	No	1	220.48		Rate Only
E13-254		1,5 mm² 4-pair o/all scr	No	1	264.58		Rate Only
E13-255		1,5 mm² 4-pair ind scr, o/all scr	No	1	264.58		Rate Only
E13-256		1,5 mm² 8-pair o/all scr	No	80	202.82	R	16,225.93
E13-257		1,5 mm² 8-pair ind scr, o/all scr	No	1	223.11		Rate Only
E13-258		1,5 mm² 12-pair o/all scr	No	1	275.60		Rate Only
E13-259		1,5 mm² 12-pair ind scr, o/all scr	No	1	275.60		Rate Only
E13-260		1,5 mm² 24-pair o/all scr	No	1	275.60		Rate Only
E13-261		1,5 mm² 24-pair ind scr, o/all scr	No	1	275.60		Rate Only
E13-262		CAT6E Network Cable	m	24	131.24	R	3,149.74
E13-263		2.5mm² x 3 core	No	20	116.92	R	2,338.44
E13-264		16mm² x 1 core Insulated Earth wire	No	20	77.55	R	1,551.01
		Service Water					
E13-265		1,5 mm² 1-pair scr	No	1	220.48		Rate Only
E13-266		1,5 mm² 2-pair o/all scr	No	160	200.44	R	32,070.08
E13-267		1,5 mm² 2-pair ind scr, o/all scr	No	1	220.48		Rate Only
E13-268		1,5 mm² 4-pair o/all scr	No	1	264.58		Rate Only
E13-269		1,5 mm² 4-pair ind scr, o/all scr	No	1	264.58		Rate Only
E13-270		1,5 mm² 8-pair o/all scr	No	8	202.82	R	1,622.59
E13-271		1,5 mm² 8-pair ind scr, o/all scr	No	1	223.11		Rate Only
E13-272		1,5 mm² 12-pair o/all scr	No	1	275.60		Rate Only
E13-273		1,5 mm² 12-pair ind scr, o/all scr	No	1	275.60		Rate Only
		Carried forward / ...				R	30,389,239.63

		Brought forward / ...				R	30,389,239.63
E13-274		1,5 mm² 24-pair o/all scr	No	1	275.60		Rate Only
E13-275		1,5 mm² 24-pair ind scr, o/all scr	No	1	275.60		Rate Only
E13-276		CAT6E Network Cable	m	42	131.24	R	5,512.05
E13-277		2.5mm² x 3 core	No	50	116.92	R	5,846.11
E13-278		16mm² x 1 core Insulated Earth wire	No	50	77.55	R	3,877.52
		TSE Pump station					
E13-279		1,5 mm² 1-pair scr	m	1	220.48		Rate Only
E13-280		1,5 mm² 2-pair o/all scr	m	58	200.44	R	11,625.40
E13-281		1,5 mm² 2-pair ind scr, o/all scr	m	1	220.48		Rate Only
E13-282		1,5 mm² 4-pair o/all scr	m	1	264.58		Rate Only
E13-283		1,5 mm² 4-pair ind scr, o/all scr	m	1	264.58		Rate Only
E13-284		1,5 mm² 8-pair o/all scr	m	8	202.82	R	1,622.59
E13-285		1,5 mm² 8-pair ind scr, o/all scr	m	1	223.11		Rate Only
E13-286		1,5 mm² 12-pair o/all scr	m	1	275.60		Rate Only
E13-287		1,5 mm² 12-pair ind scr, o/all scr	m	1	275.60		Rate Only
E13-288		1,5 mm² 24-pair o/all scr	m	1	275.60		Rate Only
E13-289		1,5 mm² 24-pair ind scr, o/all scr	m	1	275.60		Rate Only
E13-290		CAT6E Network Cable	m	1	131.24	R	131.24
E13-291		2.5mm² x 3 core	m	20	116.92	R	2,338.44
E13-292		16mm² x 1 core Insulated Earth wire	m	20	77.55	R	1,551.01
		EXCAVATIONS					
		Excavate and set excavated material aside for re-use as filling for cable or sleeve trench not exceeding 1m deep					
E13-447		In earth	m³	500	450.00	R	225,000.00
E13-448		In soft rock	m³	20	800.00	R	16,000.00
E13-449		In rock	m³	1	1500.00		Rate Only
E13-450		Selected and approved material for backfilling, bedding and cover	m³	700	450.00	R	315,000.00
E13-451		Surplus excavated material spread and levelled on site as directed	m³	500	350.00	R	175,000.00
E13-452		Danger tape - 400mm wide overlapping	m	4 220	8.00	R	33,760.00
E13-453		Cable marker, with engraved aluminum plate	No	250	750.00	R	187,500.00
		Other:-					
E13-454		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **……..**	Item				
TOTAL OF BILL E13 CARRIED TO SUMMARY						**R**	**31,374,004.00**

	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3B Section B2	**BILL E14**				
	14	**MEASURING INSTRUMENTS**				
		Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:				
		Inlet Works (1001780-0000-DRG-MM-0021 to 0023)				
E14-1		Ultrasonic Level Transmitter (Weir and Flume Flow), sensor, and sensor cable complete.	No	16	46443.41	R 743,094.56
E14-2		Flow switches	No	6	7250.40	R 43,502.40
E14-3		Pressure transmitter, sensor, and sensor cable complete.	No	6	10234.80	R 61,408.80
E14-4		Hydro Static Level transmitter, sensor, and sensor cable complete.	No	6	23613.41	R 141,680.46
E14-5		Proximity switches	No	18	780.00	R 14,040.00
E14-6		Temperature instruments transducer	No	0		
E14-7		Temperature instruments (Windings and Bearings)	No	80	4788.00	R 383,040.00
		Set of bottom bearings and stub shaft/Return mechanism suitable for the screen supplied. **All wearing parts to be supplied**				
		Bioreactor (1001780-0000-DRG-MM-0027 to -0029)				
E14-8		Ultrasonic Level Transmitter (Weir and Flume Flow), sensor, and sensor cable complete.	No	14	46443.41	R 650,207.74
E14-9		Electro magnetic flow transmitter, sensor, and sensor cable complete.(49MD01-PIP01-FT-01, 41RX06-MET01-FT-01,42RX06-MET01-FT-01,43RX06-MET01-FT-01,44RX06-MET01 FT-01)	No	5	100894.94	R 504,474.70
E14-10		Pressure transmitter, sensor, and sensor cable complete.	No	1	9910.80	R 9,910.80
		Carried forward / ...				R 2,551,359.46

	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 2,551,359.46
E14-11		Proximity switches	No	44		R 34,320.00
E14-12		Dissolved oxygen measurement transmitter, sensor, and sensor cable complete.	No	24	81379.66	R 1,953,111.84
E14-13		Temperature instruments transducer	No	182	5946.00	R 1,082,172.00
		Primary settling (1001780-0000-DRG-MM-0024, 1001780-0000-DRG-MM-0051, 1001780-0000-DRG-MM-0052)				
E14-14		Ultrasonic Level Transmitter (Weir and Flume Flow), sensor, and sensor cable complete.	No	14	46443.41	R 650,207.74
E14-15		Electro magnetic flow transmitter, sensor, and sensor cable complete.(77MD01-MET01-FT-01, 77MD14-MET01-FT-01,77MD15-MET01-FT-0177MD16-MET01-FT-01)	No	4	113251.88	R 453,007.52
E14-16		Flow switches	No	9	7250.40	R 65,253.60
E14-17		Pressure transmitter, sensor, and sensor cable complete.	No	4	10234.80	R 40,939.20
E14-18		Pressure switches	No	7	7438.80	R 52,071.60
E14-19		Radar Level Transmitter, sensor and sensor cable complete	No	6	24146.21	R 144,877.26
E14-20		Sludge Blanket transmitter, sensor, and sensor cable complete.	No	4	124862.15	R 499,448.60
E14-21		Proximity switches	No	16	780.00	R 12,480.00
E14-22		Temperature instruments transducer	No	7	5946.00	R 41,622.00
		Secondary Settling (1001780-0000-DRG-MM-0030 to 0033)				
E14-23		Electro magnetic flow transmitter, sensor, and sensor cable complete.(77MD96-MET01-FT-01, 83MD01-MET01-FT-01)	No	2	96047.84	R 192,095.68
E14-24		Flow switches	No	4	7250.40	R 29,001.60
E14-25		Pressure transmitter, sensor, and sensor cable complete.	No	2	10234.80	R 20,469.60
E14-26		Pressure switches	No	2	7438.80	R 14,877.60
		Carried forward / ...				R 7,837,315.30

	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 7,837,315.30
E14-27		Ultrasonic level transmitter, sensor, and sensor cable complete.	No	2	24146.21	R 48,292.42
E14-28		Sludge Blanket transmitter, sensor, and sensor cable complete.	No	12	124862.36	R 1,498,348.32
E14-29		Proximity switches	No	40	780.00	R 31,200.00
E14-30		Temperature instruments transducer	No	2	5946.00	R 11,892.00
E14-31		Level Switch	No	1	3171.60	R 3,171.60
		Dewatering (1001780-0000-DRG-MM-0053 To 0059, 1001780-0000-DRG-MM-0070 to 0072)				
E14-32		Electro magnetic flow transmitter, sensor, and sensor cable complete.(1001780-0000-DRG-MM-0053, 1001780-0000-DRG-MM-0054, 77MD66-MET01-FT-01, 77MD67-MET01-FT-01, 77MD68-MET01-FT-01, 77MD69-MET01-FT-01, 77MD72-MET01-FT-01, 77MD73-MET01-FT-01, 77MD74-MET01-FT-01, 77MD75-MET01-FT-01, 77MD76-MET01-FT-01, 77MD77-MET01-FT-01, 77MD78-MET01-FT-01, 77MD79-MET01-FT-01, 77MD80-MET01-FT-01, 77MD81-MET01-FT-01, 98MD01-MET01-FT-01,98MD02-MET01-FT-01, 1001780-0000-DRG-MM-0057, 77MD55-MET01-FT-01, 77MD51-MET01-FT-01, 77MD52-MET01-FT-01, 66AUD01-MET01-FT-01, 6AUD01-MET02-FT-01,77MD86-MET01-FT-01, 77MD87-MET01-FT-01, 77MD88-MET01-FT-01, 77MD89-MET01-FT-01, 77MD90-MET01-FT-01, 77MD91-MET01-FT-01, 77MD92-MET01-FT-01, 77MD93-MET01-FT-01, 77MD94-MET01-FT-01, 77MD95-MET01-FT-01)	No	39	146417.05	R 5,710,264.95
E14-33		Electro magnetic flow transmitter, sensor, and sensor cable complete.(EX) (98MD01-MET01-FT-01,98MD02-MET01-FT-01, 77MD55-MET01-FT-01)	No	3	112802.69	R 338,408.07
E14-34		Flow switches	No	25	7250.40	R 181,260.00
E14-35		Flow switches(EX)	No	12	17490.00	R 209,880.00
E14-36		Pressure transmitter, sensor, and sensor cable complete.	No	34	10234.80	R 347,983.20
E14-37		Pressure transmitter, sensor, and sensor cable complete.(EX)	No	6	12508.65	R 75,051.90
E14-38		Pressure switches	No	30	7438.80	R 223,164.00
		Carried forward / ...				R 16,516,231.76

	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 16,516,231.76
E14-39		Ultrasonic level transmitter, sensor, and sensor cable complete.	No	2	24146.21	R 48,292.42
E14-40		Radar Level Transmitter, sensor and sensor cable complete	No	16	50278.01	R 804,448.16
E14-41		Sludge Blanket transmitter, sensor, and sensor cable complete.	No	2	124861.52	R 249,723.04
E14-42		Proximity switches	No	26	780.00	R 20,280.00
E14-42a		Proximity switches(EX)	No	12	454.80	R 5,457.60
E14-44		Dissolved oxygen measurement transmitter, sensor, and sensor cable complete.	No	4	81378.92	R 325,515.68
E14-45		Temperature instruments transducer	No	122	5946.00	R 725,412.00
E14-46		Temperature instruments (Windings and Bearings)	No	161	4788.00	R 770,868.00
E14-47		Temperature instruments transducer (EX)	No	8	12474.48	R 99,795.84
E14-48		Solenoid Valve	No	20		Incl
E14-49		Pneumatic Valve	No	16		Incl
		Primary Sludge (1001780-0000-DRG-MM-0059 to 0061)				
E14-50		Electro magnetic flow transmitter, sensor, and sensor cable complete.(66MD10-MET01-FT-01, 66MD11-MET01-FT-01, 66MD12-MET01-FT-01, 66MD13-MET01-FT-01)	No	4	80643.71	R 322,574.84
E14-51		Flow switches	No	4	7250.40	R 29,001.60
E14-52		Pressure transmitter, sensor, and sensor cable complete.	No	6	10234.80	R 61,408.80
E14-53		Pressure switches	No	4	7438.80	R 29,755.20
E14-54		Ultrasonic level transmitter, sensor, and sensor cable complete.	No	8	24146.21	R 193,169.68
E14-55		Proximity switches	No	28	780.00	R 21,840.00
E14-56		Temperature instruments transducer	No	4	5946.00	R 23,784.00
		Waste Activated Sludge (1001780-0000-DRG-MM-0059, 1001780-0000-DRG-MM-0063 to 0067)				
		Carried forward / ...				R 20,247,558.62

	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 20,247,558.62
E14-57		Electro magnetic flow transmitter, sensor, and sensor cable complete.(66MD16-MET01-FT-01,66MD17-MET01-FT-01,66MD18-MET01-FT-01,66MD19-MET01-FT-01,66MD20-MET01-FT-01,66MD21-MET01-FT-01,66MD22-MET01-FT-01,66MD23-MET01-FT-01,66MD24-MET01-FT-01,66MD25-MET01-FT-01)	No	10	80643.77	R 806,437.70
E14-58		Flow switches	No	10	7250.40	R 72,504.00
E14-59		Pressure transmitter, sensor, and sensor cable complete.	No	30	10234.80	R 307,044.00
E14-60		Pressure switches	No	10	7438.80	R 74,388.00
E14-61		Ultrasonic level transmitter, sensor, and sensor cable complete.	No	24	24146.21	R 579,509.04
E14-62		Proximity switches	No	120	780.00	R 93,600.00
E14-63		Temperature instruments transducer	No	10	5946.00	R 59,460.00
E14-64		Level Switch	No	10	3171.60	R 31,716.00
		Ultra Violet Filtration (1001780-0000-DRG-MM-0034)				
E14-65		Ultrasonic level transmitter, sensor, and sensor cable complete.	No	4	24146.21	R 96,584.84
E14-66		Proximity switches	No	20	780.00	R 15,600.00
		Service Water (1001780-0000-DRG-MM-0035 to 0037)				
E14-67		Ultrasonic Level Transmitter (Weir and Flume Flow), sensor, and sensor cable complete.	No	4	46443.41	R 185,773.64
E14-68		Electro magnetic flow transmitter, sensor, and sensor cable complete.(72MD01-MET01-FT-01, 72MD01-MET01-FT-02. 73MD86-MET01-FT-01,73MD04-MET01-FT-01)	No	4	228876.10	R 915,504.40
E14-69		Flow switches	No	7	6058.80	R 42,411.60
E14-70		Pressure transmitter, sensor, and sensor cable complete.	No	9	10234.80	R 92,113.20
E14-71		Pressure switches	No	3	7438.80	R 22,316.40
E14-72		Ultrasonic level transmitter, sensor, and sensor cable complete.	No	4	24146.21	R 96,584.84
E14-73		Proximity switches (EX)	No	15	454.80	R 6,822.00
		Carried forward / ...				R 23,745,928.28

	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 23,745,928.28
E14-74		Temperature instruments (Windings and Bearings)	No	26	4788.00	R 124,488.00
E14-75		Chlorine Analyser Transmitter	No	1	102662.21	R 102,662.21
E14-76		Vibration transmitter, sensor, and sensor cable complete.	No	20	4287.60	R 85,752.00
E14-77		Solenoid Valve	No	11		Included
E14-78		Pneumatic Valve	No	9		Included
E14-79		Weight transmitter, sensor, and sensor cable complete.	No	12	13378.61	R 160,543.32
		TSE Pump Station (1001780-0000-DRG-MM-0035 to 0038)				
E14-80		Electro magnetic flow transmitter, sensor, and sensor cable complete.(76MD01-MET01-FT-01, 76MD07-MET01-FT-01, 76MD08-MET01-FT-01, 76MD09-MET01-FT-01)	No	4	189973.72	R 759,894.88
E14-81		Flow switches	No	7	6058.80	R 42,411.60
E14-82		Pressure transmitter, sensor, and sensor cable complete.	No	2	10234.80	R 20,469.60
E14-83		Temperature instruments (Windings and Bearings)	No	70	4788.00	R 335,160.00
E14-84		Vibration transmitter, sensor, and sensor cable complete.	No	28	4287.60	R 120,052.80
E14-85		Solenoid Valve	No	12		incl
E14-86		Pneumatic Valve	No	12		incl
		Allow for all the costs and expenses in connection with the installation commisioning and testing of the following equipment:				
		Inlet Works (1001780-0000-DRG-MM-0021 to 0023)				
E14-87		Ultrasonic Level Transmitter (Weir and Flume Flow), sensor, and sensor cable complete.	No	16	4818.75	R 77,100.00
E14-88		Flow switches	No	6	1650.00	R 9,900.00
E14-89		Pressure transmitter, sensor, and sensor cable complete.	No	6	1650.00	R 9,900.00
E14-90		Hydro Static Level transmitter, sensor, and sensor cable complete.	No	6	4818.75	R 28,912.50
		Carried forward / ...				R 25,623,175.19

	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 25,623,175.19
E14-91		Proximity switches	No	18	2200.00	R 39,600.00
E14-92		Temperature instruments transducer	No	0		
E14-93		Temperature instruments (Windings and Bearings)	No	80	2200.00	R 176,000.00
		Bioreactor (1001780-0000-DRG-MM-0027 to -0029)				
E14-94		Ultrasonic Level Transmitter (Weir and Flume Flow), sensor, and sensor cable complete.	No	14	4818.75	R 67,462.50
E14-95		Electro magnetic flow transmitter, sensor, and sensor cable complete.(49MD01-PIP01-FT-01, 41RX06-MET01-FT-01,42RX06-MET01-FT-01,43RX06-MET01-FT-01,44RX06-MET01 FT-01)	No	5	4268.75	R 21,343.75
E14-96		Pressure transmitter, sensor, and sensor cable complete.	No	1	1650.00	R 1,650.00
E14-97		Proximity switches	No	44	2200.00	R 96,800.00
E14-98		Dissolved oxygen measurement transmitter, sensor, and sensor cable complete.	No	24	4268.75	R 102,450.00
E14-99		Temperature instruments transducer	No	182	3850.00	R 700,700.00
		Primary settling (1001780-0000-DRG-MM-0024, 1001780-0000-DRG-MM-0051, 1001780-0000-DRG-MM-0052)				
E14-100		Ultrasonic Level Transmitter (Weir and Flume Flow), sensor, and sensor cable complete.	No	14	4818.75	R 67,462.50
E14-101		Electro magnetic flow transmitter, sensor, and sensor cable complete.(77MD01-MET01-FT-01, 77MD14-MET01-FT-01,77MD15-MET01-FT-0177MD16-MET01-FT-01)	No	4	4268.75	R 17,075.00
E14-102		Flow switches	No	9	1650.00	R 14,850.00
E14-103		Pressure transmitter, sensor, and sensor cable complete.	No	4	1650.00	R 6,600.00
E14-104		Pressure switches	No	7	1650.00	R 11,550.00
E14-105		Radar Level Transmitter, sensor and sensor cable complete	No	6	4818.75	R 28,912.50
E14-106		Sludge Blanket transmitter, sensor, and sensor cable complete.	No	4	4818.75	R 19,275.00
		Carried forward / ...				R 26,994,906.44

	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 26,994,906.44
E14-107		Proximity switches	No	16	2200.00	R 35,200.00
E14-108		Temperature instruments transducer	No	7	2200.00	R 15,400.00
		Secondary Settling (1001780-0000-DRG-MM-0030 to 0033)				
E14-109		Electro magnetic flow transmitter, sensor, and sensor cable complete.(77MD96-MET01-FT-01, 83MD01-MET01-FT-01)	No	2	4268.75	R 8,537.50
E14-110		Flow switches	No	4	1650.00	R 6,600.00
E14-111		Pressure transmitter, sensor, and sensor cable complete.	No	2	1650.00	R 3,300.00
E14-112		Pressure switches	No	2	1650.00	R 3,300.00
E14-113		Ultrasonic level transmitter, sensor, and sensor cable complete.	No	2	4818.75	R 9,637.50
E14-114		Sludge Blanket transmitter, sensor, and sensor cable complete.	No	12	4818.75	R 57,825.00
E14-115		Proximity switches	No	40	2200.00	R 88,000.00
E14-116		Temperature instruments transducer	No	2	2200.00	R 4,400.00
E14-117		Level Switch	No	1	3850.00	R 3,850.00
		Dewatering (1001780-0000-DRG-MM-0053 To 0059, 1001780-0000-DRG-MM-0070 to 0072)				
E14-118		Electro magnetic flow transmitter, sensor, and sensor cable complete.(1001780-0000-DRG-MM-0053, 1001780-0000-DRG-MM-0054, 77MD66-MET01-FT-01, 77MD67-MET01-FT-01, 77MD68-MET01-FT-01, 77MD69-MET01-FT-01, 77MD72-MET01-FT-01, 77MD73-MET01-FT-01, 77MD74-MET01-FT-01, 77MD75-MET01-FT-01, 77MD76-MET01-FT-01, 77MD77-MET01-FT-01, 77MD78-MET01-FT-01, 77MD79-MET01-FT-01, 77MD80-MET01-FT-01, 77MD81-MET01-FT-01, 98MD01-MET01-FT-01,98MD02-MET01-FT-01, 1001780-0000-DRG-MM-0057, 77MD55-MET01-FT-01, 77MD51-MET01-FT-01, 77MD52-MET01-FT-01, 66AUD01-MET01-FT-01, 6AUD01-MET02-FT-01,77MD86-MET01-FT-01, 77MD87-MET01-FT-01, 77MD88-MET01-FT-01, 77MD89-MET01-FT-01, 77MD90-MET01-FT-01, 77MD91-MET01-FT-01, 77MD92-MET01-FT-01, 77MD93-MET01-FT-01, 77MD94-MET01-FT-01, 77MD95-MET01-FT-01)	No	39	5918.75	R 230,831.25
		Carried forward / ...				R 27,461,787.69

	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 27,461,787.69
E14-119		Electromagnetic flow transmitter, sensor, and sensor cable complete. (EX) (98MD01-MET01 FT-01,98MD02-MET01-FT-01, 77MD55-MET01-FT-01)	No	3	4268.75	R 12,806.25
E14-120		Flow switches	No	25	2200.00	R 55,000.00
E14-121		Flow switches (EX)	No	12	3850.00	R 46,200.00
E14-122		Pressure transmitter, sensor, and sensor cable complete.	No	34	1650.00	R 56,100.00
E14-123		Pressure switches	No	30	1650.00	R 49,500.00
E14-124		Ultrasonic level transmitter, sensor, and sensor cable complete.	No	2	4818.75	R 9,637.50
E14-125		Radar Level Transmitter, sensor and sensor cable complete	No	16	4818.75	R 77,100.00
E14-126		Sludge Blanket transmitter, sensor, and sensor cable complete.	No	2	4818.75	R 9,637.50
E14-127		Proximity switches	No	26	2200.00	R 57,200.00
E14-128		Dissolved oxygen measurement transmitter, sensor, and sensor cable complete.	No	4	4268.75	R 17,075.00
E14-129		Temperature instruments transducer	No	122	2200.00	R 268,400.00
E14-130		Temperature instruments (Windings and Bearings)	No	161	2200.00	R 354,200.00
E14-131		Temperature instruments transducer (EX)	No	8	3850.00	R 30,800.00
E14-132		Solenoid Valve	No	20	2200.00	R 44,000.00
E14-133		Pneumatic Valve	No	16	2200.00	R 35,200.00
		Primary Sludge (1001780-0000-DRG-MM-0059 to 0061)				
E14-134		Electromagnetic flow transmitter, sensor, and sensor cable complete. (66MD10-MET01-FT-01, 66MD11-MET01-FT-01, 66MD12-MET01-FT-01, 66MD13-MET01-FT-01)	No	4	4268.75	R 17,075.00
E14-135		Flow switches	No	4	1650.00	R 6,600.00
E14-136		Pressure transmitter, sensor, and sensor cable complete.	No	6	1650.00	R 9,900.00
E14-137		Pressure switches	No	4	1650.00	R 6,600.00
E14-138		Ultrasonic level transmitter, sensor, and sensor cable complete.	No	8	4818.75	R 38,550.00
E14-139		Proximity switches	No	28	2200.00	R 61,600.00
		Carried forward / ...				R 28,724,968.94

	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 28,724,968.94
E14-140		Temperature instruments transducer	No	4	2200.00	R 8,800.00
		Waste Activated Sludge (1001780-0000-DRG-MM-0059, 1001780-0000-DRG-MM-0063 to 0067)				
E14-141		Electromagnetic flow transmitter, sensor, and sensor cable complete. (66MD16-MET01-FT-01,66MD17-MET01-FT-01,66MD18-MET01-FT-01,66MD19-MET01-FT-01,66MD20-MET01-FT-01,66MD21-MET01-FT-01,66MD22-MET01-FT-01,66MD23-MET01-FT-01,66MD24-MET01-FT-01,66MD25-MET01-FT-01)	No	10	4268.75	R 42,687.50
E14-142		Flow switches	No	10	1650.00	R 16,500.00
E14-143		Pressure transmitter, sensor, and sensor cable complete.	No	30	1650.00	R 49,500.00
E14-144		Pressure switches	No	10	1650.00	R 16,500.00
E14-145		Ultrasonic level transmitter, sensor, and sensor cable complete.	No	24	4818.75	R 115,650.00
E14-146		Proximity switches	No	120	2200.00	R 264,000.00
E14-147		Temperature instruments transducer	No	10	2200.00	R 22,000.00
E14-148		Level Switch	No	10	3850.00	R 38,500.00
		Ultraviolet Filtration (1001780-0000-DRG-MM-0034)				
E14-149		Ultrasonic level transmitter, sensor, and sensor cable complete.	No	4	4818.75	R 19,275.00
E14-150		Proximity switches	No	20	2200.00	R 44,000.00
		Service Water (1001780-0000-DRG-MM-0035 to 0037)				
E14-151		Ultrasonic Level Transmitter (Weir and Flume Flow), sensor, and sensor cable complete.	No	4	4818.75	R 19,275.00
E14-152		Electromagnetic flow transmitter, sensor, and sensor cable complete. (72MD01-MET01-FT-01, 72MD01-MET01-FT-02. 73MD86-MET01-FT-01,73MD04-MET01-FT-01)	No	4	5918.75	R 23,675.00
E14-153		Flow switches	No	7	1650.00	R 11,550.00
E14-154		Pressure transmitter, sensor, and sensor cable complete.	No	9	3300.00	R 29,700.00
		Carried forward / ...				R 29,446,581.44

	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 29,446,581.44
E14-155		Pressure switches	No	3	1650.00	R 4,950.00
E14-156		Ultrasonic level transmitter, sensor, and sensor cable complete.	No	4	4818.75	R 19,275.00
E14-157		Proximity switches	No	15	2200.00	R 33,000.00
E14-158		Temperature instruments (Windings and Bearings)	No	26	2200.00	R 57,200.00
E14-159		Chlorine Analyser Transmitter	No	1	8118.75	R 8,118.75
E14-160		Vibration transmitter, sensor, and sensor cable complete.	No	20	3850.00	R 77,000.00
E14-161		Solenoid Valve	No	11	2200.00	R 24,200.00
E14-162		Pneumatic Valve	No	9	2200.00	R 19,800.00
E14-163		Weight transmitter, sensor, and sensor cable complete.	No	12	4818.75	R 57,825.00
		TSE Pump Station (1001780-0000-DRG-MM-0035 to 0038)				
E14-164		Electromagnetic flow transmitter, sensor, and sensor cable complete (76MD01-MET01-FT-01, 76MD07-MET01-FT-01, 76MD08-MET01-FT-01, 76MD09-MET01-FT-01)	No	4	7568.75	R 30,275.00
E14-165		Flow switches	No	7	1650.00	R 11,550.00
E14-166		Pressure transmitter, sensor, and sensor cable complete.	No	2	1650.00	R 3,300.00
E14-167		Temperature instruments (Windings and Bearings)	No	70	2200.00	R 154,000.00
E14-168		Vibration transmitter, sensor, and sensor cable complete.	No	28	3850.00	R 107,800.00
E14-169		Solenoid Valve	No	12	2200.00	R 26,400.00
E14-170		Pneumatic Valve	No	12	2200.00	R 26,400.00
		Carried forward / ...				R 30,107,675.19

	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 30,107,675.19
E14-171		Switchgear changes as directed by the Engineer brought on by process design changes	Prov Sum	1	175 000	R 175,000.00
E14-172		Percentage adjustment on above item for Contractor's overheads and profit	%	175 000		R 28,000.00
		Provisional Sums				
E14-173		Additional Field instrumentation as directed by the Engineer	Prov Sum	1	200 000	R 200,000.00
E14-174		Percentage adjustment on above item for Contractor's overheads and profit	%	200 000		R 32,000.00
E14-175		Additional Field instrumentation as forthcoming from HAZOP workshops	Prov Sum	1	200 000	R 200,000.00
E14-176		Percentage adjustment on above item for Contractor's overheads and profit	%	200 000		R 32,000.00
		Other:-				
E14-176		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify)	Item			
		P&G Instruments	No	1	496100.00	R 496,100.00
		.....				
		.....				
		.....				
TOTAL OF BILL E14 CARRIED TO SUMMARY						**R 31,270,775.19**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		BILL E15				
	Vol 3B Section B2 8	**CONTROL & INSTRUMENTATION CABINETS AND JUNCTION BOXES**				
		Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:				
		Inlet Works				
E15-1		Instrumentation Remote Junction Box (Incl. Steel Work and mounting accessories)	No	15	109573.63	R 1,643,604.42
E15-2		Solenoid Valve Bank Panel (Incl. Steel Work and mounting accessories)	No	2	139810.88	R 279,621.76
		Bioreactor				
E15-3		Instrumentation Remote Junction Box (Incl. Steel Work and mounting accessories)	No	51	120023.02	R 6,121,174.14
E15-4		Solenoid Valve Bank Panel (Incl. Steel Work and mounting accessories)	No	1	139810.88	Rate Only
		Primary Settling				
E15-5		Instrumentation Remote Junction Box (Incl. Steel Work and mounting accessories)	No	6	97981.15	R 587,886.90
E15-6		Solenoid Valve Bank Panel (Incl. Steel Work and mounting accessories)	No	1	139810.88	Rate Only
		Secondary Settling				
E15-7		Instrumentation Remote Junction Box (Incl. Steel Work and mounting accessories)	No	32	99508.13	R 3,184,260.28
E15-8		Solenoid Valve Bank Panel (Incl. Steel Work and mounting accessories)	No	1	139810.88	Rate Only
		Blower				
E15-9		Instrumentation Remote Junction Box (Incl. Steel Work and mounting accessories)	No	1	121103.87	Rate Only
E15-10		Solenoid Valve Bank Panel (Incl. Steel Work and mounting accessories)	No	1	139810.88	Rate Only
		Dewatering				
		Carried forward / ...				R 11,816,547.50

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 11,816,547.50
E15-11		Instrumentation Remote Junction Box (Incl. Steel Work and mounting accessories)	No	57	100588.98	R 5,733,571.91
E15-12		Solenoid Valve Bank Panel (Incl. Steel Work and mounting accessories)	No	3	139810.88	R 419,432.64
		Primary Sludge				
E15-13		Instrumentation Remote Junction Box (Incl. Steel Work and mounting accessories)	No	6	110644.32	R 663,865.93
E15-14		Local Control Panel (Incl. Steel Work and mounting accessories)	No	6	123967.36	R 743,804.18
E15-15		Solenoid Valve Bank Panel (Incl. Steel Work and mounting accessories)	No	1	139810.88	Rate Only
		Waste Activated Sludge				
E15-16		Instrumentation Remote Junction Box (Incl. Steel Work and mounting accessories)	No	14	112320.76	R 1,572,490.68
E15-17		Local Control Panel (Incl. Steel Work and mounting accessories)	No	14	123967.36	R 1,735,543.08
E15-18		Solenoid Valve Bank Panel (Incl. Steel Work and mounting accessories)	No	1	139810.88	Rate Only
		Ultra Violet Filtration				
E15-19		Instrumentation Remote Junction Box (Incl. Steel Work and mounting accessories)	No	9	111537.71	R 1,003,839.41
E15-20		Solenoid Valve Bank Panel (Incl. Steel Work and mounting accessories)	No	1	139810.88	R 139,810.88
		Service Water				
E15-21		Instrumentation Remote Junction Box (Incl. Steel Work and mounting accessories)	No	15	121103.87	R 1,816,558.04
E15-22		Solenoid Valve Bank Panel (Incl. Steel Work and mounting accessories)	No	3	139810.88	R 419,432.64
		TSE Pump Station				
E15-23		Instrumentation Remote Junction Box (Incl. Steel Work and mounting accessories)	No	8	106614.80	R 852,918.40
E15-24		Solenoid Valve Bank Panel (Incl. Steel Work and mounting accessories)	No	1	139810.88	R 139,810.88
		Allow for all costs and expenses in connection with the installation of the following:-				
		Carried forward / ...				R 27,057,626.18

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 27,057,626.18
		Inlet Works				
E15-25		Instrumentation Remote Junction Box (Incl. Steel Work and mounting accessories)	No	15	7659.85	R 114,897.79
E15-26		Solenoid Valve Bank Panel (Incl. Steel Work and mounting accessories)	No	2	3705.85	R 7,411.71
		Bioreactor				
E15-27		Instrumentation Remote Junction Box (Incl. Steel Work and mounting accessories)	No	51	10553.57	R 538,232.30
E15-28		Solenoid Valve Bank Panel (Incl. Steel Work and mounting accessories)	No	1	4076.44	Rate Only
		Primary Settling				
E15-29		Instrumentation Remote Junction Box (Incl. Steel Work and mounting accessories)	No	6	4085.25	R 24,511.53
E15-30		Solenoid Valve Bank Panel (Incl. Steel Work and mounting accessories)	No	1	4076.44	Rate Only
		Secondary Settling				
E15-31		Instrumentation Remote Junction Box (Incl. Steel Work and mounting accessories)	No	32	7064.09	R 226,050.76
E15-32		Solenoid Valve Bank Panel (Incl. Steel Work and mounting accessories)	No	1	4076.44	Rate Only
		Blower				
E15-33		Instrumentation Remote Junction Box (Incl. Steel Work and mounting accessories)	No	1	11608.93	Rate Only
E15-34		Solenoid Valve Bank Panel (Incl. Steel Work and mounting accessories)	No	1	4076.44	Rate Only
		Dewatering				
E15-35		Instrumentation Remote Junction Box (Incl. Steel Work and mounting accessories)	No	57	8255.62	R 470,570.27
E15-36		Solenoid Valve Bank Panel (Incl. Steel Work and mounting accessories)	No	3	3705.85	R 11,117.56
		Primary Sludge				
E15-37		Instrumentation Remote Junction Box (Incl. Steel Work and mounting accessories)	No	6	5872.55	R 35,235.32
E15-38		Local Control Panel (Incl. Steel Work and mounting accessories)	No	6	715.85	R 4,295.10
		Carried forward / ...				R 28,489,948.52

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 28,489,948.52
E15-39		Solenoid Valve Bank Panel (Incl. Steel Work and mounting accessories)	No	1	4076.44	Rate Only
		Waste Activated Sludge				
E15-40		Instrumentation Remote Junction Box (Incl. Steel Work and mounting accessories)	No	14	8255.62	R 115,578.66
E15-41		Local Control Panel (Incl. Steel Work and mounting accessories)	No	14	715.85	R 10,021.90
E15-42		Solenoid Valve Bank Panel (Incl. Steel Work and mounting accessories)	No	1	4076.44	Rate Only
		Ultra Violet Filtration				
E15-43		Instrumentation Remote Junction Box (Incl. Steel Work and mounting accessories)	No	9	7659.85	R 68,938.67
E15-44		Solenoid Valve Bank Panel (Incl. Steel Work and mounting accessories)	No	1	3705.85	R 3,705.85
		Service Water				
E15-45		Instrumentation Remote Junction Box (Incl. Steel Work and mounting accessories)	No	15	11745.11	R 176,176.61
E15-46		Solenoid Valve Bank Panel (Incl. Steel Work and mounting accessories)	No	3	3705.85	R 11,117.56
		Service Water				
E15-47		Instrumentation Remote Junction Box (Incl. Steel Work and mounting accessories)	No	8	7659.85	R 61,278.82
E15-48		Solenoid Valve Bank Panel (Incl. Steel Work and mounting accessories)	No	1	3705.85	R 3,705.85
		Other:-				
E15-49		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify)	Item	-		
		Supply 8mm Pneumatic Tubing	**m**	**2 700**	45.50	R 122,850.00
		Install 8mm Pneumatic Tubing	**m**	**2 700**	8.11	R 21,892.50
		Supply 8mm Pneumatic Push-in fitting	**No.**	**360**	84.50	R 30,420.00
		Install 8mm Pneumatic Push-in fitting	**No.**	**360**	64.87	R 23,352.00
		Per Unique Loop - AI & SI certification	**No.**	**1**	5643.81	Rate only
		Per EX Loop - Design	**No.**	**1**	550.00	Rate only
TOTAL OF BILL E15 CARRIED TO SUMMARY						**R 29,138,986.96**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3B Section B2	**BILL E16**				
	16	**FIBRE OPTIC COMMUNICATION SYSTEMS**				
		Allow for all costs and expenses in connection with the supply, delivery, offloading and storage of the following:				
		Steel Tape Armoured Multi-Mode Fibre Cable				
		Main Site Fibre Ring				
E16-1		6 core MM armoured cable	m	1 000	28.79	R 28,788.50
E16-2		12 core MM armoured cable	m	6 200	33.48	R 207,545.00
		Inlet Works				
E16-3		6 core MM armoured cable	m	1	31.00	Rate Only
E16-4		12 core MM armoured cable	m	3 300	33.48	R 110,467.50
		Bioreactor				
E16-5		6 core MM armoured cable	m	1	31.00	Rate Only
E16-6		12 core MM armoured cable	m	4 200	33.48	R 140,595.00
		Primary Settling				
E16-7		6 core MM armoured cable	m	1	31.00	Rate Only
E16-8		12 core MM armoured cable	m	1 900	33.48	R 63,602.50
		Secondary Settling				
E16-9		6 core MM armoured cable	m	1	31.00	Rate Only
E16-10		12 core MM armoured cable	m	4 800	33.48	R 160,680.00
		Blowers				
E16-11		6 core MM armoured cable	m	1	31.00	Rate Only
E16-12		12 core MM armoured cable	m	1	36.05	Rate Only
		Dewatering				
E16-13		6 core MM armoured cable	m	1	31.00	Rate Only
E16-14		12 core MM armoured cable	m	6 100	33.48	R 204,197.50
		Carried forward / ...				R 915,876.00

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 915,876.00
		Primary Sludge				
E16-15		6 core MM armoured cable	m	1	31.00	Rate Only
E16-16		12 core MM armoured cable	m	2 400	33.48	R 80,340.00
		Waste Activated Sludge				
E16-17		6 core MM armoured cable	m	1	31.00	Rate Only
E16-18		12 core MM armoured cable	m	5 600	33.48	R 187,460.00
		Ultra Violet Filtration				
E16-19		6 core MM armoured cable	m	1	31.00	Rate Only
E16-20		12 core MM armoured cable	m	3 200	33.48	R 107,120.00
		Service Water				
E16-21		12 core MM armoured cable	m	3 300	28.79	R 95,002.05
		TSE Pump Station				
E16-22		6 core MM armoured cable	m	1	31.00	Rate Only
E16-23		12 core MM armoured cable	m	900	33.48	R 30,127.50
		Cable terminations for Fibre Cable Splices, complete, including gland shroud, lugs, tag numbers, etc and connection.				
		Main Site Fibre Ring				
E16-24		6 core MM armoured cable	No.	24	93.73	R 2,249.52
E16-25		12 core MM armoured cable	No.	176	93.73	R 16,496.48
		Inlet Works				
E16-26		6 core MM armoured cable	No.	1	93.73	Rate Only
E16-27		12 core MM armoured cable	No.	136	93.73	R 12,747.28
		Bioreactor				
E16-28		6 core MM armoured cable	No.	1	93.73	Rate Only
E16-29		12 core MM armoured cable	No.	408	93.73	R 38,241.84
		Primary Settling				
E16-30		6 core MM armoured cable	No.	1	93.73	Rate Only
		Carried forward / ...				R 1,485,660.67

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 1,485,660.67
E16-31		12 core MM armoured cable	No.	48	93.73	R 4,499.04
		Secondary Settling				
E16-32		6 core MM armoured cable	No.	1	93.73	Rate Only
E16-33		12 core MM armoured cable	No.	248	93.73	R 23,245.04
		Blowers				
E16-34		6 core MM armoured cable	No.	1	93.73	Rate Only
E16-35		12 core MM armoured cable	No.	1	93.73	R 93.73
		Dewatering				
E16-36		6 core MM armoured cable	No.	1	93.73	Rate Only
E16-37		12 core MM armoured cable	No.	480	93.73	R 44,990.40
		Primary Sludge				
E16-38		6 core MM armoured cable	No.	1	93.73	Rate Only
E16-39		12 core MM armoured cable	No.	96	93.73	R 8,998.08
		Waste Activated Sludge				
E16-40		6 core MM armoured cable	No.	1	93.73	Rate Only
E16-41		12 core MM armoured cable	No.	224	93.73	R 20,995.52
		Ultra Violet Filtration				
E16-42		6 core MM armoured cable	No.	1	93.73	Rate Only
E16-43		12 core MM armoured cable	No.	80	93.73	R 7,498.40
		Service Water				
E16-44		6 core MM armoured cable	No.	1	93.73	Rate Only
E16-45		12 core MM armoured cable	No.	144	93.73	R 13,497.12
		TSE Pump Station				
E16-46		6 core MM armoured cable	No.	1	93.73	Rate Only
E16-47		12 core MM armoured cable	No.	216	93.73	R 20,245.68
		Allow for all costs and expenses in connection with the site installation of the following:				
		Inlet Works				
		Carried forward / ...				R 1,629,723.68

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 1,629,723.68
E16-48		6 core MM armoured cable	m	1	15.51	Rate Only
E16-49		12 core MM armoured cable	m	3 300	15.51	R 51,183.28
		Bioreactor				
E16-50		6 core MM armoured cable	m	1	15.51	Rate Only
E16-51		12 core MM armoured cable	m	4 200	15.51	R 65,142.35
		Primary Settling				
E16-52		6 core MM armoured cable	m	1	15.51	Rate Only
E16-53		12 core MM armoured cable	m	1 900	15.51	R 29,469.16
		Secondary Settling				
E16-54		6 core MM armoured cable	m	1	15.51	Rate Only
E16-55		12 core MM armoured cable	m	4 800	15.51	R 74,448.40
		Blowers				
E16-56		6 core MM armoured cable	m	1	15.51	Rate Only
E16-57		12 core MM armoured cable	m	1	15.51	Rate Only
		Dewatering				
E16-58		6 core MM armoured cable	m	1	15.51	Rate Only
E16-59		12 core MM armoured cable	m	6 100	15.51	R 94,611.51
		Primary Sludge				
E16-60		6 core MM armoured cable	m	1	15.51	Rate Only
E16-61		12 core MM armoured cable	m	2 400	15.51	R 37,224.20
		Waste Activated Sludge				
E16-62		6 core MM armoured cable	m	1	15.51	Rate Only
E16-63		12 core MM armoured cable	m	5 600	15.51	R 86,856.47
		Ultra Violet Filtration				
E16-64		6 core MM armoured cable	m	1	15.51	Rate Only
E16-65		12 core MM armoured cable	m	3 200	15.51	R 49,632.27
		Service Water				
E16-66		6 core MM armoured cable	m	1	15.51	Rate Only
		Carried forward / ...				R 2,118,291.31

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 2,118,291.31
E16-67		12 core MM armoured cable	m	3 300	15.51	R 51,183.28
		Cable terminations for Fibre Cable Splices, complete, including gland shroud, lugs, tag numbers, etc and connection.				
		Main Site Fibre Ring				
E16-24		6 core MM armoured cable	No.	24	795.79	R 19,098.88
E16-25		12 core MM armoured cable	No.	176	795.79	R 140,058.44
		Inlet Works				
E16-26		6 core MM armoured cable	No.	1	795.79	Rate Only
E16-27		12 core MM armoured cable	No.	136	795.79	R 108,226.98
		Bioreactor				
E16-28		6 core MM armoured cable	No.	1	795.79	Rate Only
E16-29		12 core MM armoured cable	No.	408	795.79	R 324,680.93
		Primary Settling				
E16-30		6 core MM armoured cable	No.	1	795.79	Rate Only
E16-31		12 core MM armoured cable	No.	48	795.79	R 38,197.76
		Secondary Settling				
E16-32		6 core MM armoured cable	No.	1	795.79	Rate Only
E16-33		12 core MM armoured cable	No.	248	795.79	R 197,355.07
		Blowers				
E16-34		6 core MM armoured cable	No.	1	795.79	Rate Only
E16-35		12 core MM armoured cable	No.	1	795.79	R 795.79
		Dewatering				
E16-36		6 core MM armoured cable	No.	1	795.79	Rate Only
E16-37		12 core MM armoured cable	No.	480	795.79	R 381,977.56
		Primary Sludge				
E16-38		6 core MM armoured cable	No.	1	795.79	Rate Only
E16-39		12 core MM armoured cable	No.	96	795.79	R 76,395.51
		Carried forward / ...				R 3,456,261.49

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 3,456,261.49
		Waste Activated Sludge				
E16-40		6 core MM armoured cable	No.	1	795.79	Rate Only
E16-41		12 core MM armoured cable	No.	224	795.79	R 178,256.19
		Ultra Violet Filtration				
E16-42		6 core MM armoured cable	No.	1	795.79	Rate Only
E16-43		12 core MM armoured cable	No.	80	795.79	R 63,662.93
		Service Water				
E16-44		6 core MM armoured cable	No.	1	795.79	Rate Only
E16-45		12 core MM armoured cable	No.	144	795.79	R 114,593.27
		TSE Pump Station				
E16-46		6 core MM armoured cable	No.	1	795.79	Rate Only
E16-47		12 core MM armoured cable	No.	216	795.79	R 171,889.90
		Allow for all the costs and expenses in connection with the execution of the following equipment tests:				
E16-68		Perform OTDR tests on the optical fibre LAN	Sum	1	95020.59	R 95,020.59
E16-69		Perform PMLS tests on the optical fibre LAN	Sum	1	95020.59	R 95,020.59
		Other:-				
E16-70		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **……..** **……..** **……..** **……..** **……..**	Item	-		
TOTAL OF BILL E16 CARRIED TO SUMMARY						**R 4,174,704.96**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3B Section B2	**BILL E17**				
	11	**TELEMETRY EQUIPMENT**				
		Allow for all costs and expenses in connection with the supply, delivery, offloading and storage of the following:				
E17-1		Macassar Pump Sation communication Panel	No	1	82138.02	R 82,138.02
E17-2		Helderberg Pump Sation communication Panel	No	1	82138.02	R 82,138.02
E17-3		Macassar WWTW communication Panel	No	1	82138.02	R 82,138.02
		Allow for all costs and expenses in connection with the Site installation of the following:-				
E17-4		Macassar Pump Sation communication Panel	No	1	32300.80	R 32,300.80
E17-5		Helderberg Pump Sation communication Panel	No	1	32300.80	R 32,300.80
E17-6		Macassar WWTW communication Panel	No	1	32300.80	R 32,300.80
		Other:-				
E17-7		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **……..** **……..** **……..** **……..** **……..**	Item	-		
TOTAL OF BILL E17 CARRIED TO SUMMARY						**R 343,316.45**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3B Section B2	**BILL E18**				
	10	**DATA ARCHITECTURE, SCADA, HISTORIAN AND REPORTING**				
		Allow for all the costs and expenses in connection with the manufacture, testing, supplying, delivery, offloading and storage of the following materials and equipment:				
E18-1		SCADA, Historian and Reporting Hardware (inc. Dewatering and Weighbridge Operator Stations)	Sum	1	6764212.66	R 6,764,212.66
E18-2		SCADA, Historian and Reporting Software	Sum	1	2138297.86	R 2,138,297.86
E18-3		SCADA and Historian Software Development (inc. Dewatering and Weighbridge Operator Stations)	Sum	1	3765515.24	R 3,765,515.24
E18-4		Reporting (Datawarehouse, dashboards and visualisation) development	Sum	1	1364648.01	R 1,364,648.01
		Allow for all costs and expenses in connection with the Site installation of the following:-				
E18-5		SCADA and Historian Hardware (inc. Dewatering and Weighbridge Operator Stations)	Sum	1	82919.29	R 82,919.29
		Provisional Sums				
E18-6		Additional SCADA updates or mimics refinement during DNP as directed by the Engineer	Prov Sum	1	175 000	R 175,000.00
E18-7		Percentage adjustment on above item for Contractor's overheads and profit	%	175 000		R 28,000.00
E18-8		Integration with COCT DSS as directed by the Engineer	Prov Sum	1	175 000	R 175,000.00
E18-9		Percentage adjustment on above item for Contractor's overheads and profit	%	175 000		R 28,000.00
E18-10		Predictive Maintenance Software	Prov Sum	1	175 000	R 175,000.00
E18-11		Percentage adjustment on above item for Contractor's overheads and profit	%	175 000		R 28,000.00
		Carried forward / ...				R 14,724,593.06

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 14,724,593.06
E18-12		**Other:-** All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **.....** **.....** **.....** **.....** **.....**	Item	-		
TOTAL OF BILL E18 CARRIED TO SUMMARY						**R 14,724,593.06**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3B Section B2	**BILL E19**				
	8	**PROGRAMMABLE LOGIC CONTROLLER(PLC)**				
		Allow for all the costs and expenses in connection with the manufacture, painting, testing, supplying, delivery, offloading and storage of the following materials and equipment:				
E19-1		PLC Software Licensing	No	1	83881.14	R 83,881.14
E19-2		Network Management Software Licensing	No	1	515467.62	R 515,467.62
E19-3		Condition Software Licensing	No	1	289969.31	R 289,969.31
		Inlet Works				
E19-4		PLC Panel (Excl Steel Work) - Main PLC Panel Type Double Door Hot-Standby - With HMI	No	1	1139641.68	R 1,139,641.68
E19-5		PLC Panel (Excl Steel Work) - Main PLC Panel Type Double Door Hot-Standby - Without HMI	No	1	1103555.63	R 1,103,555.63
		Bioreactor				
E19-6		PLC Panel (Excl Steel Work) - Main PLC Pane Type Double Door Standard PLC - With HMI	No	1	1000405.13	R 1,000,405.13
E19-7		PLC Panel (Excl Steel Work) - Main PLC Panel Type Double Door No PLC - Without HMI	No	1	964319.08	R 964,319.08
		Primary Settling				
E19-8		PLC Panel (Excl Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI	No	1	801552.91	R 801,552.91
		Carried forward / ...				R 5,898,792.51

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 5,898,792.51
		Secondary Settling				
E19-9		PLC Panel (Excl Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI	No	1	778957.30	R 778,957.30
		Blower				
E19-10		PLC Panel (Excl Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI	No	1	926204.72	R 926,204.72
		Dewatering				
E19-11		PLC Panel (Excl Steel Work) - Main PLC Pane Type Double Door Standard PLC - With HMI	No	1	1282981.70	R 1,282,981.70
E19-12		PLC Panel (Excl Steel Work) - Main PLC Panel Type Double Door No PLC - Without HMI	No	1	1246895.65	R 1,246,895.65
		Primary Sludge				
E19-13		PLC Panel (Excl Steel Work) - Main PLC Panel Type Single Door Standard PLC - Without HMI	No	3	584133.10	R 1,752,399.30
		Waste Activated Sludge				
E19-14		PLC Panel (Excl Steel Work) - Main PLC Panel Type Single Door Standard PLC - Without HMI	No	7	600111.03	R 4,200,777.19
		Carried forward / ...				R 16,087,008.37

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 16,087,008.37
		Service Water				
E19-15		PLC Panel (Excl Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI	No	1	851431.42	R 851,431.42
E19-16		Conditional Monitoring Equipment	No	5	95801.33	Rate Only
		TSE Pump Station				
E19-17		PLC Panel (Excl Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI	No	1	891379.33	R 891,379.33
E19-18		Conditional Monitoring Equipment	No	7	95801.33	R 670,609.29
		Allow for all costs and expenses in connection with the installation of the following:-				
		Inlet Works				
E19-19		PLC Panel (Excl Steel Work) - Main PLC Panel Type Double Door Hot-Standby - With HMI	No	1	138553.03	R 138,553.03
E19-20		PLC Panel (Excl Steel Work) - Main PLC Panel Type Double Door Hot-Standby - Without HMI	No	1	138553.03	R 138,553.03
E19-21		PLC Software Development	Sum	1	651480.36	R 651,480.36
		Bioreactor				
E19-22		PLC Panel (Excl Steel Work) - Main PLC Pane Type Double Door Standard PLC - With HMI	No	1	236318.05	R 236,318.05
E19-23		PLC Panel (Excl Steel Work) - Main PLC Panel Type Double Door No PLC - Without HMI	No	1	236318.05	R 236,318.05
E19-24		PLC Software Development	Sum	1	1136313.82	R 1,136,313.82
		Primary Settling				
E19-25		PLC Panel (Excl Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI	No	1	139211.20	R 139,211.20
		Carried forward / ...				R 21,177,175.93

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 21,177,175.93
E19-26		PLC Software Development	Sum	1	335848.32	R 335,848.32
		Secondary Settling				
E19-27		PLC Panel (Excl Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI	No	1	133998.88	R 133,998.88
E19-28		PLC Software Development	Sum	1	332662.79	R 332,662.79
		Blower				
E19-29		PLC Panel (Excl Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI	No	1	191780.34	R 191,780.34
E19-30		Conditional Monitoring Equipment	No	1	558114.31	Rate Only
		Dewatering				
E19-31		PLC Panel (Excl Steel Work) - Main PLC Panel Type Double Door No PLC - Without HMI	No	1	604347.87	R 604,347.87
E19-32		PLC Software Development	Sum	1	1470321.10	R 1,470,321.10
		Primary Sludge				
E19-33		PLC Panel (Excl Steel Work) - Main PLC Panel Type Single Door Standard PLC - Without HMI	No	3	55128.69	R 165,386.07
E19-34		PLC Software Development	Sum	1	144337.47	R 144,337.47
		Waste Activated Sludge				
E19-35		PLC Panel (Excl Steel Work) - Main PLC Panel Type Single Door Standard PLC - Without HMI	No	7	158291.05	R 1,108,037.37
E19-36		PLC Software Development	Sum	1	158291.05	R 158,291.05
		Carried forward / ...				R 25,822,187.19

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 25,822,187.19
		Ultra Violet Filtration				
E19-37		PLC Panel (Excl Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI	No	1	111134.94	R 111,134.94
E19-38		PLC Software Development	Sum	1	268512.12	R 268,512.12
		Service Water				
E19-39		PLC Panel (Excl Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI	No	1	110403.64	R 110,403.64
E19-40		Conditional Monitoring Equipment	No	5	2519.98	Rate Only
E19-41		PLC Software Development	Sum	1	260828.65	R 260,828.65
		TSE Pump Station				
E19-42		PLC Panel (Excl Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI	No	1	102538.56	R 102,538.56
E19-43		Conditional Monitoring Equipment	No	7	2519.98	Rate Only
E19-44		PLC Software Development	Sum	1	240717.78	R 240,717.78
E19-45		Additional programming or software modifications required, as directed by the Engineer, due to process changes	Prov Sum	1	175 000	R 175,000.00
E19-46		Percentage adjustment on above item for Contractor's overheads and profit	%	175 000		R 28,000.00
		Other:-				
E19-47		All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify)	Item	-		
		Ultra Violet Filtration				
E19-48		PLC Panel (Excl Steel Work) - Main PLC Panel Type Single Door Standard PLC - With HMI	No	1	741450.33	R 741,450.33
		.....				
		.....				
		.....				
TOTAL OF BILL E19 CARRIED TO SUMMARY						**R 27,860,773.21**

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
	Vol 3B Section B1 & B2	**BILL E20** **MISCELLANEOUS AND SUNDRIES**				
		Boardroom/VR Room Equipment				
E20-1		70" LED screen, with wall mounting	Sum	1	23954.71	R 23,954.71
E20-2		50" touch screen (for reception visitor interaction) with mounting	Sum	1	64646.92	R 64,646.92
E20-3		Refinement of BIM model for post construction purposes	Prov Sum	1	175 000	R 175,000.00
E20-4		Percentage adjustment on above item for Contractor's overheads and profit	%	175 000		R 28,000.00
		Witnessed Factory Acceptance Testing				
E20-5		Primary MV switchgear	Sum	1	345450.00	R 345,450.00
E20-6		Substation Automation	Sum	1	0.00	Included
E20-7		Secondary MV switchgear	Sum	1	24969.00	R 24,969.00
E20-8		Distribution Transformers	Sum	1	314195.00	R 314,195.00
E20-9		Isolation Transformers	Sum	1	44885.00	R 44,885.00
E20-10		MV cables	Sum	1	29375.00	R 29,375.00
E20-11		LV Switchgear, control assemblies and VFCs	Sum	1	0.00	Included
E20-12		Diesel Generators	Sum	1	183300.00	R 183,300.00
E20-13		Instrumentation	Sum	1		
E20-14		PLCs and Control hardware and panels	Sum	1		Included
E20-15		PLCs and Control system: software and functionality	Sum	1		Included
E20-16		Instrumentation Junction Box, Valve Bank, Local Control Panel and Communication Panel Control Hardware and Steelwork	Sum	1		Included
E20-17		SCADA, Historian and Reporting	Sum	1		Included
E20-18		Additional factory testing and factory inspections as directed by the Engineer	Prov Sum	1	100 000	R 100,000.00
E20-19		Percentage adjustment on above item for Contractor's overheads and profit	%	100 000		R 16,000.00
		Carried forward / ...				R 1,349,775.63

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 1,349,775.63
		Independent inspector				
		Decommissioning and removal of existing equipment				
E20-20		Decommissioning, making safe and removal of all electrical and electronic equipment to contractor fenced yard on site	Sum	1	182541.75	R 182,541.75
		Daywork (provisional)				
		Allow for the cost of all labour (at full cost of employment), materials and plant, H&S PPE and induction, overheads and profit, superintendence and management				
E20-21		Software engineer / system integrator	hr	800	1375.00	R 1,100,000.00
E20-22		OEM commissioning engineer	hr	80	2500.00	R 200,000.00
E20-23		Electrical / Electronic design engineer	hr	200	1375.00	R 275,000.00
E20-24		BIM modeller	hr	120	1000.00	R 120,000.00
E20-25		MV cable jointer / ORHVS registered responsible person	hr	200	900.00	R 180,000.00
E20-26		Electrical foreman	hr	240	750.00	R 180,000.00
E20-27		Skilled labour (Artisan/Electrician)	hr	240	660.00	R 158,400.00
		Provisional Sums				
E20-28		Modifications and upgrades to existing electrical infrastructure as directed by the Engineer	Prov Sum	1	175 000	R 175,000.00
E20-29		Percentage adjustment on above item for Contractor's overheads and profit	%	175 000		R 28,000.00
E20-30		Upgrade and provision of ICT network or general IT infrastructure, at the Macassar WWTW as directed by the Engineer	Prov Sum	1	175 000	R 175,000.00
E20-31		Percentage adjustment on above item for Contractor's overheads and profit	%	175 000		R 28,000.00
E20-32		Visualisation models for training and plant familiarization	Prov Sum	1	175 000	R 175,000.00
E20-33		Percentage adjustment on above item for Contractor's overheads and profit	%	175 000		R 28,000.00
		Carried forward / ...				R 4,354,717.38

Item No	Chief Reference	Short Description	Unit	Quantity	Rate	Amount
		Brought forward / ...				R 4,354,717.38
E20-34		**Other:-** All other items not included above but which are nevertheless necessary to meet the Scope of Work and/or are required for the proper, safe and effective operation of the plant (Specify) **.....** **.....** **.....** **.....** **.....**	Item	-		
TOTAL OF BILL E20 CARRIED TO SUMMARY						**R 4,354,717.38**

BOQ SUMMARY			
MECHANICAL			
BILL P&Gs	GENERAL REQUIREMENTS AND CONDITIONS	R	264,144,552
BILL M1	ARCHIMEDEAN SCREW PUMPS	R	31,190,673
BILL M2	SCREENS & WASHING SCREW PRESSES	R	19,898,668
BILL M3	GRIT REMOVAL EQUIPMENT	R	10,996,308
BILL M4	SLUICE GATES, HAND STOPS AND WEIRS	R	23,417,799
BILL M5	ODOUR CONTROL & COVERS	R	25,160,666
BILL M6	PRIMARY SETTLING TANKS	R	15,404,714
BILL M7	VERTICAL SHAFT MIXERS	R	16,937,217
BILL M8	FINE BUBBLE DIFFUSED AERATION	R	89,401,892
BILL M9	INTERNAL RECYCLE PUMPS	R	7,018,813
BILL M10	RETURN ACTIVATED SLUDGE PUMPS	R	5,455,717
BILL M11	SECONDARY SETTLING TANKS	R	45,904,171
BILL M12	ULTRAVIOLET DISINFECTION EQUIPMENT	R	39,248,772
BILL M13	CHLORINE BUILDING	R	8,082,134
BILL M14	CHEMICAL DOSING EQUIPMENT	R	13,221,735
BILL M15	COMPRESSED AIR SYSTEMS (INSTRUMENT AIR)	R	2,531,032
BILL M16	RETURN FLOW PUMP STATION	R	1,184,763
BILL M17	TSE PUMP STATION	R	30,238,372
BILL M18	SERVICE WATER SUPPLY SYSTEM	R	16,192,146
BILL M19	PRIMARY SLUDGE SCREENING EQUIPMENT	R	10,007,342
BILL M20	MAIN (MULTIPURPOSE) SLUDGE PUMPSTATION	R	8,496,530
BILL M21	GRAVITY THICKENERS	R	2,775,999
BILL M22	HYDROCYCLONES	R	6,449,051
BILL M23	BIOGAS HANDLING EQUIPMENT	R	26,575,022
BILL M24	SLUDGE HEATING EQUIPMENT	R	21,472,484
BILL M25	ANAEROBIC DIGESTER SLUDGE EQUIPMENT	R	21,827,365
BILL M26	SLUDGE HOLDING TANKS EQUIPMENT	R	40,701,011
BILL M27	SLUDGE DEWATERING EQUIPMENT	R	232,739,032
BILL M28	CAKE SILO LIVE BOTTOMS	R	19,903,685
BILL M29	POLYELECTROLYTE PREPARATION EQUIPMENT	R	15,228,608
BILL M30	COMBINED HEAT AND POWER (CHP) PLANT	R	63,262,332
BILL M31	LIFTING EQUIPMENT	R	12,930,807
BILL M32	VENTILATION SYSTEMS	R	14,690,113
BILL M33	SPARES	R	68,422,700

MECHANICAL (CONTINUED)			
BILL M34	SUNDRIES	R	116,571,323
BILL M35	PROCESS CONTROL ASSISTANCE, MAINTENANCE AND TRAINING (FULL TIME)	R	50,648,944
BILL M36	MAINTENANCE INSPECTIONS (PART TIME)	R	4,805,585
ELECTRICAL			
BILL E1	SUPPLY AND LOCAL AUTHORITY LIASON	R	3,886,439
BILL E2	PRIMARY MV SWITCHGEAR	R	78,508,287
BILL E3	SECONDARY MV SWITCHGEAR	R	7,772,402
BILL E4	DISTRIBUTION TRANSFORMERS	R	31,964,530
BILL E5	ISOLATION TRANSFORMERS	R	12,102,809
BILL E6	MV CABLING	R	42,367,738
BILL E7	LV SWITCHGEAR AND CONTROL ASSEMBLIES	R	112,331,241
BILL E8	LV CABLES	R	66,723,970
BILL E9	CABLE SUPPORTS	R	59,179,291
BILL E10	AREA LIGHTING	R	10,907,328
BILL E11	EARTHING	R	6,346,018
BILL E12	DIESEL GENERATORS	R	45,201,009
BILL E13	INSTRUMENTATION AND FIELDBUS CABLES	R	31,374,004
BILL E14	MEASURING INSTRUMENTS	R	31,270,775
BILL E15	CONTROL & INSTRUMENTATION CABINETS AND JUNCTION BOXES	R	29,138,987
BILL E16	FIBRE OPTIC COMMUNICATION SYSTEMS	R	4,174,705
BILL E17	TELEMETRY EQUIPMENT	R	343,316
BILL E18	DATA ARCHITECTURE, SCADA, HISTORIAN AND REPORTING	R	14,724,593
BILL E19	PROGRAMMABLE LOGIC CONTROLLER(PLC)	R	27,860,773
BILL E20	MISCELLANEOUS AND SUNDRIES	R	4,354,717
SUMMARY OF MECHANICAL BILL OF QUANTITIES		R	1,403,138,076
SUMMARY OF ELECTRICAL BILL OF QUANTITIES		R	620,532,935
NET OF WORKS		R	2,023,671,010

SUMMARY OF BILLS

BILL	DESCRIPTION		AMOUNT
M1 to M36	SUMMARY OF MECHANICAL BILL OF QUANTITIES	R	1,403,138,075.75
E1 to E20	SUMMARY OF ELECTRICAL BILL OF QUANTITIES	R	620,532,934.57
NET TOTAL OF WORKS		**R**	**2,032,671,010.32**
ADD CONTINGENCIES: The tenderer shall add 7.5% of the total of Bill of Quantities for Contingencies. The sum provided here for contingencies is under the sole control of the Engineer and may be deducted in whole or in part.		R	151,775,325.77
SUB-TOTAL		**R**	**2,175,446,336.10**
PLUS ALLOWANCE FOR 15% VAT		**R**	**326,316,950.41**
TENDER SUM INCLUSIVE OF VAT (TENDER AMOUNT CARRIED TO FORM OF OFFER - C1.1)		**R**	**2,501,763,286.51**

Signature of Tenderer: .....

Signed on behalf of: .....

Date: .....

DECLARATION (In respect of completeness of Tender)

City of Cape Town
Tower Block, Civic Centre
12 Hertzog Boulevard
CAPE TOWN

I/ we, the undersigned, do hereby declare that these are the properly priced Schedules of Quantities forming Part C2.2 of this Contract Document which contains 730 pages numbered ii to iv and 1 to 725 in consecutive order in Volumes 1, 2 and 3 and the number of pages in consecutive order in Volumes 3A and 3B as stated on page iv thereof, upon which my/our tender for **TENDER NO.191Q/2023/24: DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS** has been based. If I/we have submitted a printed version of the Schedules of Quantities, I/we warrant that no amendments have been made to it from the original, other than amendments issued in any Addenda in terms of Clause C.3.2 in Part T1.2 Tender Data.

SIGNED ON BEHALF OF TENDERER: .

DATE: . .

PART C1: AGREEMENTS AND CONTRACT DATA

		Page
C1.2	**Contract Data (data provided by the Employer)**	27
C1.3	**Form of Performance Guarantee**	52
C1.4	**Form of Advance Payment Guarantee**	56
C1.5	**Occupational Health and Safety Agreement**	59
C1.6	**Protection of the Environment Declaration**	60
C1.7	**Insurance Broker's Warranty**	61
C1.8	**Contract of Temporary Employment as Community Liaison Officer**	**Error! Bookmark not defined.**

CITY OF CAPE TOWN

DIRECTORATE: WATER AND SANITATION

CONTRACT NO. 191Q/2023/24

DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS

C1.2 Contract Data

Part 1: Contract Data provided by the Employer

GENERAL CONDITIONS OF CONTRACT

The following standardised General Conditions of Contract:

General Conditions which form part of the **Conditions of Contract for Plant and Design-Build for Electrical and Mechanical Works and for Building and Engineering Works Designed by the Contractor, First Edition 1999 (Yellow Book)** published by the International Federation of Consulting Engineers (FIDIC).

Copies of these Conditions of Contract (Yellow Book) may be obtained from the South African Institution of Civil Engineering (SAICE) (tel 011 805 5947) or Consulting Engineers South Africa (CESA) (tel 011 463 2022).

Copies of the Conditions of Contract (Yellow Book) are also available for inspection and scrutiny at the offices of the Employer.

The Annexes and Forms bound in the Conditions of Contract (Yellow Book) shall not apply to this Contract and shall be replaced with the documentation bound into this Contract Document.

The General Conditions make reference to the Appendix to Tender and Particular Conditions (contained in the Contract Data) which together with these conditions collectively describe the risks, liabilities and obligations of the contracting parties and the procedures for the administration of the Contract.

The General Conditions shall be read in conjunction with the variations, amendments and additions set out in the Appendix to Tender and Particular Conditions below. Each item of data given below is cross-referenced to the Clause or Sub-Clause in the General Conditions to which it mainly applies.

The documents forming the Contract are to be taken as mutually explanatory of one another. For the purposes of interpretation, the priority of the documents shall be in accordance with the sequence as stated in sub-clause 1.5 as amended in the Particular Conditions.

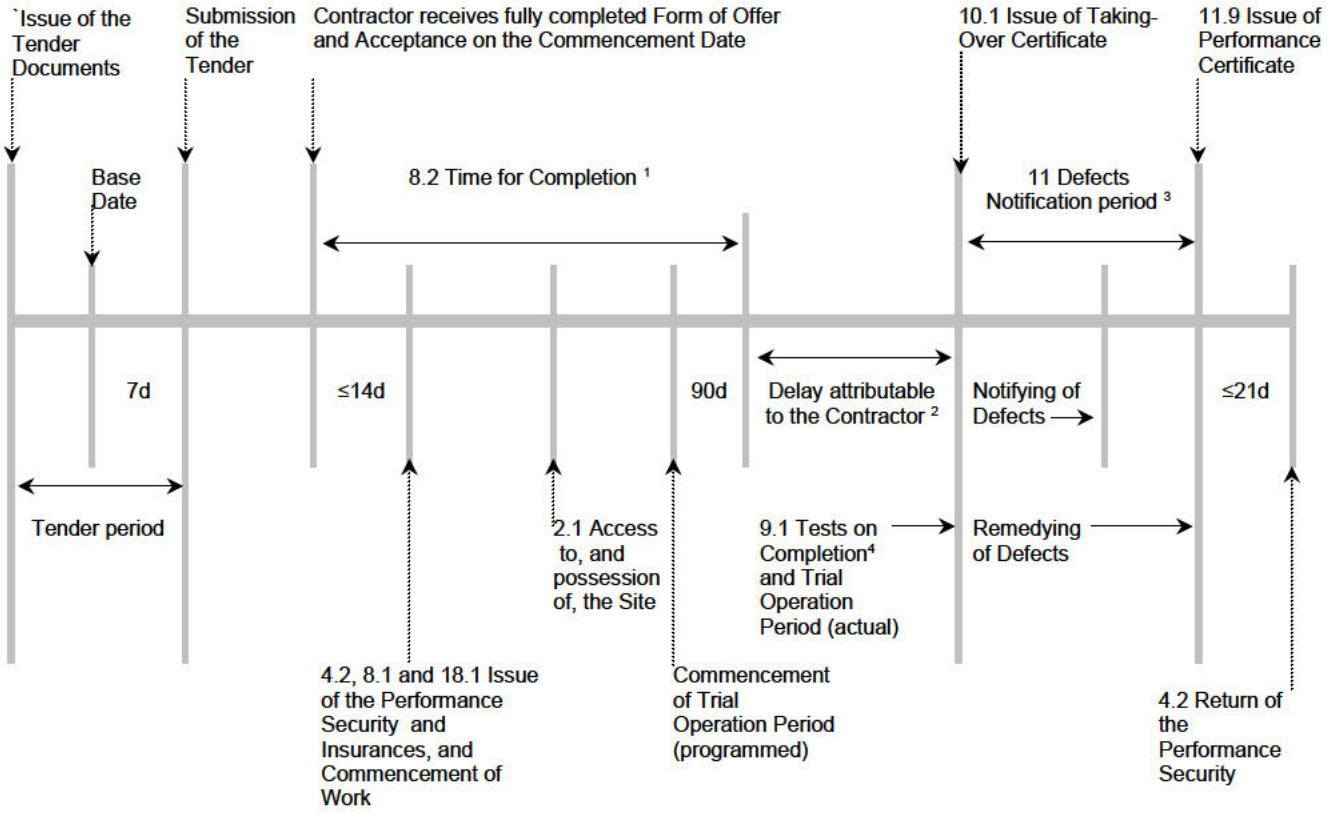
If an ambiguity or discrepancy is found in the documents, the Engineer shall issue any necessary clarification or instruction.

The Foreword to the Conditions of Contract (Yellow Book) concludes with the following:

“In order to clarify the sequence of Contract activities, reference may be made to the charts on the next two pages and to the Sub-Clauses listed below (some Sub-Clause numbers are also stated in the charts). The charts are illustrative and must not be taken into consideration in the interpretation of the Conditions of Contract.

1.1.3.1	&	13.7	Base Date
1.1.3.2	&	8.1	Commencement Date
1.1.6.6	&	4.2	Performance Security
1.1.4.7	&	14.3	Interim Payment Certificate
1.1.3.3	&	8.2	Time for Completion (as extended under 8.4)
1.1.3.4	&	9.1	Tests on Completion
1.1.3.5	&	10.1	Taking-Over Certificate
1.1.3.6	&	12.1	Tests after Completion (if any)
1.1.3.7	&	11.1	Defects Notification Period (as extended under 11.3)
1.1	&	11.9	Performance Certificate
1.1.4.4	&	14.13	Final Payment Certificate”

The charts referred to above are reproduced on the following two pages, amended and amplified where necessary to conform to the Particular Conditions for this Contract. The charts are illustrative and must not be taken into consideration in the interpretation of the Conditions of Contract.



Typical sequence of Principal Events during Contracts for Plant and Design-Build

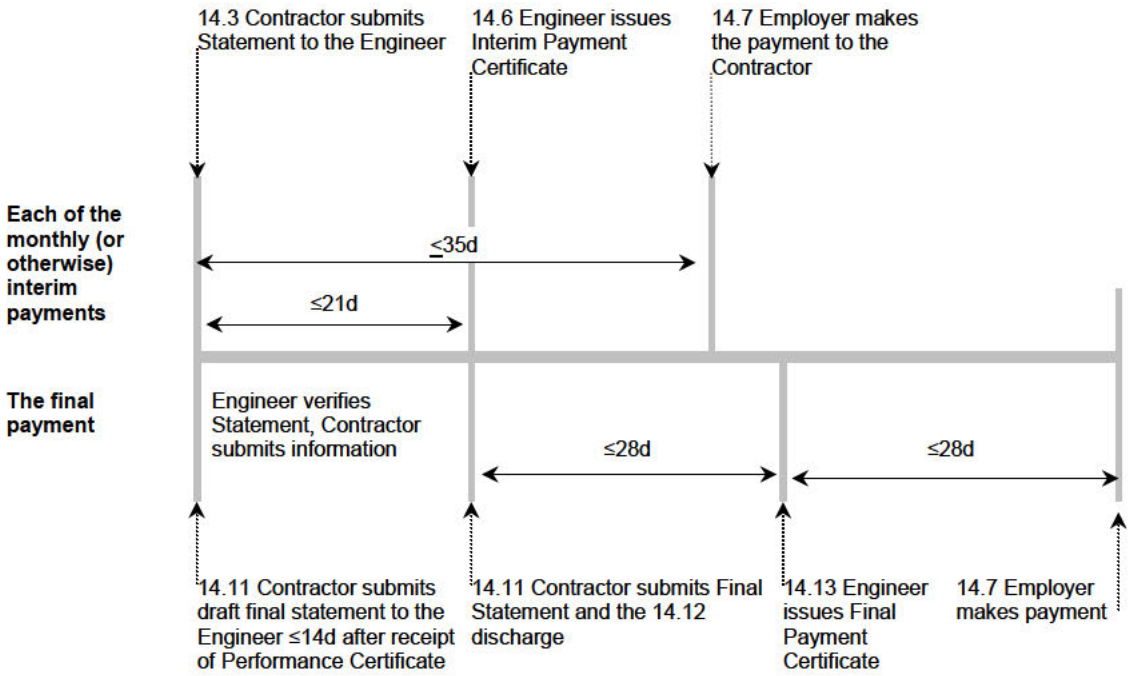
(Modified to suit this Contract)

1. The Time for Completion is stated (in the Appendix to Tender) as a number of days, to which is added any extensions of time under Sub-Clause 8.4.

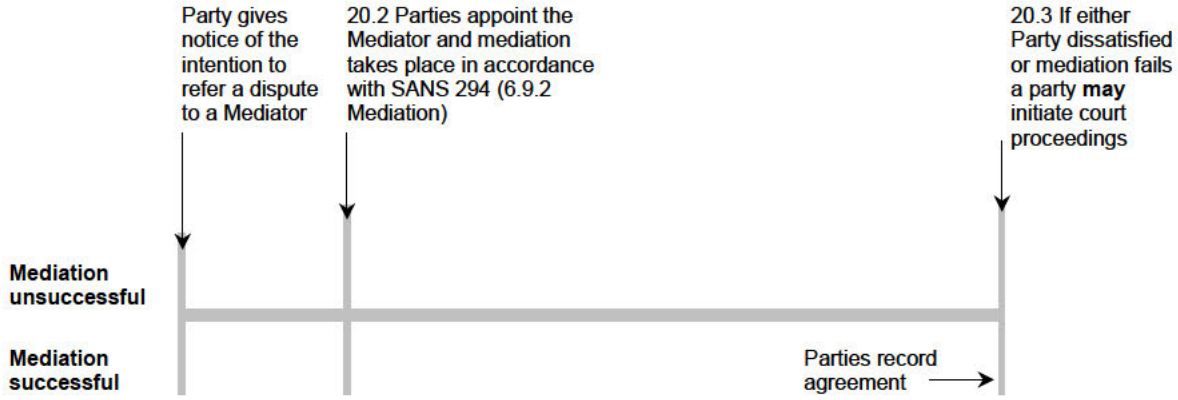
2. In order to indicate the sequence of events, the above diagram is based upon the example of the Contractor failing to comply with Sub-Clause 8.2.

3. The Defects Notification Period is stated (in the Appendix to Tender) as a number of days, to which is added any extensions under Sub-Clause 11.3.

4. Depending on the type of Works, Tests after Completion may also be required, if provided for in the Contract.



Typical Sequence of Payment Events Envisaged in Clause 14
(Modified to suit this Contract)



Typical Sequence of Dispute Events Envisaged in Clause 20
(Modified to suit this Contract)

APPENDIX TO TENDER

Part 1 : Contract Data completed by the Employer

Item	Sub-Clause	Entry
Employer's name and address	1.1.2.2 & 1.3(b)	CITY OF CAPE TOWN, represented by the Director: WATER AND SANITATION CITY OF CAPE TOWN Water and Sanitation Head Office 8 Voortrekker Road (corner of Mike Pienaar Boulevard) Cape Town Bellville 7535 and/or such other person or persons duly authorised thereto by the Employer in writing; the Employer is referred to in this Contract Document by the terms "Employer", "City of Cape Town" or "Council" as the context provides.
Engineer's name and address.....	1.1.2.4 & 1.3(b)	[redacted]
Time for Completion of the whole of the Works including the Trial Operation Period	1.1.3.3 & 8.2	1620 days which shall be inclusive of special non-working days
Defects Notification Period	1.1.3.7	365 days
Special non-working days.....	1.1.3.9.....	The special non-working days are: The SAFCEC recommended industry shutdown period in December and January. All statutory holidays. All gazetted public holidays falling outside the shutdown period.
Electronic transmission systems	1.3(a).....	e-mail or facsimile
Governing Law.....	1.4	Republic of South Africa
Ruling language.....	1.4	English
Language for communications	1.4	English
Time for access to, and possession of, the Site.....	2.1*.....	90 Days from the Commencement Date

APPENDIX TO TENDER (CONTD)

Item	Sub-Clause	Entry
Approval of Employer required for ……	3.1……	Not Applicable
Amount of Performance Security	4.2.....	7% of the Accepted Contract Amount
Period for notifying unforeseeable errors, faults and defects in the Employer's Requirements……	5.1.....	Within 21 days
Normal working hours.....	6.5.....	Between 07h00 and 17h00 week days, except locally recognised days of rest, SAFCEC recommended industry shutdown period in December and January and all gazetted public holidays.
Locally recognised days of rest……	6.5……	Saturdays and Sundays
Maximum amount of Delay penalties	8.7	The penalty for delay shall be: 1/80th of 1% of the of the Contract Award Amount (as per C1.1 Form of Offer and Acceptance) per calendar day. The maximum amount of Delay penalties shall be limited to 20% of the Contract Value (as per C1.1 Form of Offer and Acceptance). The penalty for delay for sectional completion shall be as follows: 1. The penalty for delay for sectional completion of scheduled activities which does not impact the critical path of other construction Contracts (see Clause 3.1.9 of Part C3, Scope of Work) will be a "percentage" of 1/80 of 1% of the Contract Award Amount (as per C1.1 Form of Offer and Acceptance) per calendar day. This "percentage" shall be the "Contract Award Amount of the Portion of Works subject to Sectional Completion" over "the Contract Award Amount excluding contingencies and contract price adjustment (i.e., escalation)". 2. The penalty for delay for sectional completion for scheduled activities which impacts the critical path of other construction Contracts (see Clause 3.1.9 of Part C3, Scope of Work) will result in full penalties being applied, i.e., 1/80 of 1% of the Contract Award Amount (as per C1.1 Form of Offer and Acceptance) per calendar day.
Trial Operation Period Duration……	9.1	90 days
Adjustments for Changes in Cost	13.8.....	The Contract Price shall / be subject to Contract Price Adjustment. Variations in Rates of Exchange, Customs Surcharge and Customs Duty, which shall be for the Employer's account in accordance with Sub-Clause 13.8.2.2 in the Particular Conditions shall be payable. Furthermore, as a result of an award of a contract beyond the original tender validity period, the contract execution will be completed beyond a

period of twelve (12) months from the expiry of the original tender validity period, then the contract may be subject to contract price adjustment for that period beyond such twelve (12) months. An appropriate contract price adjustment formula will be determined by the Director: Supply Chain Management if such was not included in the bid documents

Similarly, if as a result of any extension of time granted the contract execution will be completed beyond a period of twelve (12) months from the expiry of the original tender validity period, then contract price adjustment may apply to that period beyond such twelve (12) months. An appropriate contract price adjustment formula will be determined by the Director: Supply Chain Management if such was not included in the bid documents.

Where applicable, in terms of the foregoing, the value of the certificates issued shall be adjusted in accordance with Sub-Clauses 13.8.1 and 13.8.2 in the Particular Conditions, but with the Base Date being the date 182 days after the tender closing date.

APPENDIX TO TENDER (CONTD)

Item	Sub-Clause	Entry
Total advance payment…….	14.2…….	In accordance with the advance payment schedule.
Percentage of retention	14.3(c)*	5% reducing to 2.5% upon the issue of a Taking-Over Certificate. The percentage of retention will be 10% of the interim certificates.
Limit of Retention Money.....	14.3(c)*	5% of Accepted Contract Amount
Plant and Materials Intended for the Works	14.5(b)	No payment for plant and materials upon shipment
Plant and materials for payment when delivered to the Site	14.5(c)	All plant and materials delivered to site will be subject to payment in terms of this clause
Minimum amount of Interim Payment Certificates.....	14.6	No minimum
Currency/currencies of payment.....	14.15	South African Rand, as named in that section of the Form of Offer and Acceptance called "Offer"
Periods for submission of insurance:		
(a) evidence of insurance	18.1*	14 days
(b) relevant policies	18.1	14 days
Maximum amount of deductibles for insurance of the Employer's risks	18.2(d)	R10 000,
Minimum amount of third party insurance	18.3	R20 000 000,00
Special Risks Coupon Policy……..	18.5 ……	Required
The DAB shall be	20.2	One sole Member / adjudicator
Appointment (if not agreed) to be made by….	20.3	President of the South African Institution of Mechanical Engineers
Amicable Settlement will be conducted as….	20.5	Mediation
Appointment (if not agreed) to be made by….	20.5	President of the South African Institution of Mechanical Engineers
Litigation will be conducted in……	20.6*	Applicable Court of Jurisdiction in Cape Town

* See Particular Conditions

[redacted]

SIGNED ON BEHALF OF TENDERER.....

PARTICULAR CONDITIONS

The Particular Conditions are:

1 General Provisions

Sub-Clause 1.1 Definitions

1.1.1 The Contract

1.1.1.1 is deleted and replaced by:

"**Contract**" means the Form of Offer and Acceptance, Contract Data, these General Conditions, the Employer's Requirements, the Drawings, the Schedules, and the further documents (if any) which are listed in the Form of Offer and Acceptance, and further includes drawings and documents or parts thereof which any of the aforesaid documents incorporate by reference.

1.1.1.2 is deleted and replaced by:

"**Contract Agreement**" means the document called "Form of Offer and Acceptance".

1.1.1.3 is deleted and replaced by:

"**Letter of Acceptance**" means that section of the Form of Offer and Acceptance called "Acceptance".

1.1.1.4 is deleted and replaced by:

"**Letter of Tender**" means that section of the Form of Offer and Acceptance called "Offer".

1.1.1.5 is deleted and replaced by:

"**Employer's Requirements**" means the document titled "Part C3: Scope of Work", as included in the Contract, and any additions and modifications to such document in accordance with the Contract. Such document specifies the purpose, scope, and/or design and/or other technical criteria, for the Works, and includes the Specifications.

1.1.1.6 is deleted and replaced by:

"**Schedules**" means the document(s) entitled schedules, completed by the Contractor and submitted with his tender offer, as included in the Contract. Such document(s) shall include the Returnable Schedules and the Schedules of Quantities, and may include data, lists and schedules of rates and/or prices.

1.1.1.7 is deleted and replaced by:

"**Contractor's Proposal**" means the information which the Contractor submitted with the Form of Offer and Acceptance, as included in the Contract. Such information shall include the information listed in Schedule 18 in Part T2.2 Returnable Schedules and may also include the Contractor's preliminary design.

1.1.1.8 is deleted and replaced by:

"**Tender**" means that section of the Form of Offer and Acceptance called "Offer" and all other documents which the Contractor submitted as Returnable Documents, as included in the Contract.

1.1.1.9 is deleted and replaced by:

"**Appendix to Tender**" means the completed section entitled appendix to tender included in the Contract Data.

Add the following Sub-Clause after Sub-Clause 1.1.1.10:

1.1.1.11
"**Returnable Schedules**" means the Schedules contained in Part T2.2 in the Tender Data and Part C2.1 in the Pricing Data, and **"Schedules of Quantities"** means the document entitled schedules of quantities contained in Part C2.2 in the Pricing Data.

1.1.2 Parties and Persons

1.1.2.3 is deleted and replaced by:

"**Contractor**" means the person(s) named as Contractor in that section of the Form of Offer called "Offer" accepted by the Employer and the legal successors in title to this person(s).
1.1.2.9 is deleted and replaced by:

"**Mediator**" means the person appointed under Sub-Clause 20.2 [*Mediation*] in the Contract Data.

1.1.3 Dates, Tests, Periods and Completion

1.1.3.1 is deleted and replaced by:

"**Base Date**" means the date 7 days prior to the closing date for the submission of the Tender.

1.1.3.2 is deleted and replaced by:

"**Commencement Date**" means the date the Contractor receives one fully completed original copy of the document

1.1.4 Money and Payments

1.1.4.1 is deleted and replaced by:

"**Accepted Contract Amount**" means the amount accepted in that section of the Form of Offer and Acceptance called "Acceptance" for the execution and completion of the Works and the remedying of any defects.

1.1.4.6 is deleted and replaced by:

"**Foreign Currency**" means a currency in which part (if any) of the Contract Price is payable, but not the Local Currency.

Add the following Sub-Clause after Sub-Clause 1.1.4.12:

1.1.4.13 "**Contract Price Adjustment**" means the adjustment to be included in the Contract Price for fluctuations in the Cost of Plant and Materials, Site Installation, General Items (comprising General Requirements and Conditions, Health and Safety, Environmental Management, Sundries, etc.), and Variations in Rates of Exchange, Customs Surcharge and Customs Duty, all as provided for in Sub-Clause 13.8 [*Adjustments for Changes in Cost*] in the Contract Data.

1.1.4.14 "**Reasonable Profit**" means an amount not exceeding 10% of the Cost of any item or activity

1.1.5 Works and Goods

1.1.5.6 *is deleted and replaced by:*

"**Section**" means a part of the Works specified in the Appendix to Tender as a Section (if any), or a part of the Works specified as a Section during the course of the Contract by the Employer (such Section may be an item of Plant).

1.1.6 Other Definitions

Add the following Sub-Clause after Sub-Clause 1.1.6.9:

1.1.6.10 "**Letter of Notification**" means the letter of formal notification, signed by the Employer, of the decision of the Supply Chain Management Bid Adjudication Committee sent to all tenderers. The notification of the decision does not form part of the Employer's Acceptance of the successful tenderer's Form of Offer and no rights shall accrue.

1.1.6.11 **"Intellectual Property"** means any and all intellectual property rights of any nature anywhere in the world whether registered, registerable or otherwise, including patents, trademarks, registered designs and domain names, applications for any of the foregoing, trade or business names, copyright and rights in the nature of copyright, design rights, rights in databases, know-how, trade secrets and any other intellectual property rights which subsist in computer software, computer programs, websites, documents, information, techniques, business methods, drawings, logos, instruction manuals, lists and procedures and particulars of customers, marketing methods and procedures and advertising literature, including the "look and feel" of any websites

Sub-Clause 1.5 Priority of Documents

Deleted and replaced by:

The documents forming the Contract are to be taken as mutually explanatory of one another. For the purposes of interpretation, the priority of the documents shall be in accordance with the following sequence:

(a) the Form of Offer and Acceptance,
(b) the Appendix to Tender within the Contract Data,
(c) the Particular Conditions within the Contract Data,
(d) these General Conditions,
(e) the Employer's Requirements,
(f) the Drawings, and
(g) the Schedules.

If an ambiguity or discrepancy is found in the documents, the Engineer shall issue any necessary clarification or instruction.

Sub-Clause 1.6 Contract Agreement

Deleted and replaced by:

The Parties shall enter into a Contract Agreement after the Contractor is called upon to do so by the Employer. The Agreement shall be the fully completed Form of Offer and Acceptance contained in the Contract Document.

Sub-Clause 1.8 Care and Supply of Documents

Delete "six copies" in the second sentence of the first paragraph and replace with "three copies".

Sub-Clause 1.10 Employer's Use of Contractor's Documents

Deleted and replaced by:

Intellectual Property

The Contractor acknowledges that it shall not acquire any right, title or interest in or to the Intellectual Property of the Employer.

The Contractor hereby assigns to the Employer, all Intellectual Property created, developed or otherwise brought into existence by it for the purposes of the contract, unless the Parties expressly agree otherwise in writing.

The Contractor shall, and warrants that it shall:

(a) not be entitled to use the Employer's Intellectual Property for any purpose other than as contemplated in this contract;

(b) not modify, add to, change or alter the Employer's Intellectual Property, or any information or data related thereto, nor may the Contractor produce any product as a result of, including and/or arising from any such information, data and Intellectual Property, and in the event that it does produce any such product, the product shall be, and be deemed in law to be, owned by the Employer;

(c) not apply for or obtain registration of any domain name, trademark or design which is similar to any Intellectual Property of the Employer;

(d) comply with all reasonable directions or instructions given to it by the Employer in relation to the form and manner of use of the Employer Intellectual Property, including without limitation, any brand guidelines which the Employer may provide to the Contractor from time to time;

(e) procure that its employees, directors, members and Contractors comply strictly with the provisions of clauses 1.10 (a) to 1.10 (c) above;

unless the Employer expressly agrees thereto in writing after obtaining due internal authority.

The Contractor represents and warrants to the Employer that, in providing goods, services or both, as the case may be, for the duration of the contract, it will not infringe or make unauthorised use of the Intellectual Property rights of any third party and hereby indemnifies the Employer from any claims, liability, loss, damages, costs, and expenses arising from the infringement or unauthorised use by the Contractor of any third party's Intellectual Property rights.

In the event that the contract is cancelled, terminated, ended or is declared void, any and all of the Employer's Intellectual Property, and any and all information and data related thereto, shall be immediately handed over to the Employer by the Contractor and no copies thereof shall be retained by the Contractor unless the Employer expressly and in writing, after obtaining due internal authority, agrees otherwise.

Sub-Clause 1.11 Contractor's Use of Employer's Documents

Deleted this Sub-Clause.

Sub-Clause 1.12 Confidential details

Insert the following after the first paragraph:

The Parties shall treat the details of the Works comprised in this Contract as private and confidential (save in so far as may be necessary for the purposes hereof) and shall not publish or disclose the same or any particulars thereof in any trade or technical paper elsewhere without the prior written consent of the other Party.

Sub-Clause 1.13 Compliance with Laws

Insert "deposits" after "taxes" in 1.13 b).

Add the following paragraph after 1.13 (b):

(c) Where the Employer is required to apply to the Provincial Director of the Department of Labour for a construction work permit to perform the intended construction work. The employer will apply for the construction work permit as soon as possible after its Bid Adjudication Committee has awarded the contract, and the period that the Department of labour requires to issue the permit will run concurrently with the appeal period.

Sub-clause 1.14 General Provisions

The parties agree that this contract shall also be subject to the Employer's Supply Chain Management Policy that was applicable on the date the tender was advertised**, save that if the Employer adopts a new SCM Policy which contemplates that any clause therein would apply to the contract emanating from this tender, such clause shall also be applicable to that contract.** Please refer to this document contained on the CCT's website.

Abuse of the supply chain management system is not permitted and may result in cancellation of the contract, restriction of the supplier, and/or the exercise by the Employer of any other rights and remedies available to it as described in the SCM Policy.

2 The Employer

Sub-Clause 2.1 Right of Access to the Site

Add the following after the first sentence of the first paragraph:

Access to, and possession of the Site shall not take place until the issuing, by the Provincial Director of the Department of Labour, of a construction work permit to perform the intended construction work in terms of Clause 1.13 *[Compliance with Laws]*.

Add the following paragraph after 2.1 (b):

Should the issuing of a construction work permit delay the Engineer's instruction to commence executing the Works and this in turn causes a delay to Practical Completion by more than 60 days, then the Contractor shall be entitled to make a claim in accordance with the contract. Should, however, the issuing of a construction work permit be delayed by the submission of a unacceptable draft Health and Safety Plan, in the opinion of either the Employer's Health and Safety Agent, or the Provincial Director of the Department of Labour, no claim for an extension of time will be entertained.

Sub-Clause 2.4 Employer's Financial Arrangements

Delete this Sub-Clause.

Sub-Clause 2.5 Employer's Claims

Insert "or by law" after "Contract" in the first sentence of the first paragraph.

3 The Engineer

Add the following at the end of the third paragraph:

If, in exercising any discretion, the result of such decision would be to utilise the contingency allowance, increase the contract value or granting of time for practical completion, the Engineer must obtain approval from the Employer that such funding or time is available and granted by the Employer to be awarded prior to finalising such a decision.

The requirements for the Engineer to obtain the approval of the Employer before exercising a specified authority are:

(a) Clause 3.2: The delegation of duties to others
(b) Clause 4.24: The issuing of instructions for dealing with fossils and the like.
(c) Clause 6.5 (b): Giving consent for work to be carried out on days of rest or outside normal working hours.
(d) Clause 8.6: The approval of a revised programme and supporting report in order to expedite progress.
(e) Clause 8.8: Instruction to suspend the works
(f) Clause 13.1: All actions in terms of this clause that would result in the utilisation of the contingency allowance, increasing the contract value or awarding any additional time.t
(g) Clause 14.2: Agreeing to advance payment for deposits for items not listed in the Advance Payment Schedule.

Sub-Clause 3.4 Replacement of the Engineer

Deleted and replaced by:

The Employer shall have the right to replace the Engineer.

4 The Contractor

Sub-Clause 4.2 Performance Security

Delete the first sentence of the second paragraph and replace with:

The Contractor shall deliver the Performance Security to the Employer within 14 days from the Commencement Date.

Add the following at the end of the second paragraph:

The form of Performance Security shall contain the precise wording of the document included in Part C1.3 of the Contract Data: **Form of Performance Guarantee,** and it shall be issued by a financial institution approved by the Employer at the date when the guarantee is issued. The list of approved financial institutions current at the date of tender is attached to the **Form of Performance Guarantee**.

Sub-Clause 4.3 Contractor's Representative

Delete "prior to the Commencement Date" in the first sentence of the second paragraph and replace with "within 14 days from the Commencement Date".

Sub-Clause 4.4 Subcontractors

Delete "28 days' notice" in sub-paragraph (c) and replace with "14 days' notice".

Add the following clause:

d) The Contractor shall supply the Employer with proof of all orders placed with sub-contractors upon request by the Engineer. Information is to be given on each sub-order sufficient to identify the material or equipment to which the sub-order relates and to notify the sub-contractor that the conditions of the Specification apply.

Sub-Clause 4.8 Safety Procedures

Add the following:

The Contractor's attention is also drawn to the Health and Safety Specification in the Employer's Requirements.

The Employer and the Contractor shall enter into an agreement to complete the work required for the construction of the Works in terms of the provisions of Section 37(2) of the Occupational Health and Safety Act, 85 of 1993 and the Construction Regulations, 2014 promulgated thereunder.
An agreement is included in the Contract Document (Part C1.5 in Agreements and Contract Data) and shall be completed and submitted to the Employer together with a letter of good standing from the Compensation Commissioner (if not insured with a licenced compensation insurer) within fourteen (14) days after the Commencement Date. The Contractor shall ensure that any letter of good standing shall be timeously renewed in order that it remains in full force for the duration of the Contract.

Sub-Clause 4.10 Site Data

Add the following at the end of the first sentence:

”As contained in the Employer’s Requirements, if applicable.”

Sub-Clause 4.16 Transport of Goods

Delete “and” after sub-paragraph (b) and add the following to sub-paragraph(c):

In this regard the Contractor’s attention is also drawn to Sub-Clause 18.2(f)(i) in the Particular Conditions; and

Add the following sub-paragraph:

(d) the Contractor shall provide all lifting facilities unless specified otherwise in the Detailed Mechanical Specification in the Employer’s Requirements.

Sub-Clause 4.17 Contractor’s Equipment

Add the following:

The Contractor shall provide all necessary storage facilities on Site.

Sub-Clause 4.18 Protection of the Environment

Add the following:

The Contractor’s attention is also drawn to the Environmental Management Specification in the Employer’s Requirements.

Sub-Clause 4.21 Progress Reports

Delete “ in six copies” in the first sentence and replace with “electronically and one hard copy”.

Sub-Clause 4.22 Security of the Site

Add the following sub-paragraph:

(c) The Contractor shall in connection with the Works provide and maintain at his own cost all lights, guards, fencing, watching and other appropriate security measures when and where necessary or required by the Engineer or by any competent statutory or other authority for the protection and security of the Works and the Contractor's Equipment, or for the safety and convenience of the public and for the protection of life and property.

Sub-Clause 4.23 Contractor’s Operations on Site

Add the following:

The Contractor shall protect and cover up all works as may be required and take all other precautions necessary to avoid causing damage or soiling of new and existing plant, equipment, buildings and structures. This shall inter alia apply when activities such as abrasive blasting, painting, welding, grinding, sealing, lagging and so forth, must be performed on the Site. The Contractor shall, on completion, remove all covers and shall at his cost rectify all soiling and damage to finishes to the satisfaction of the Engineer.

6 Staff and Labour

Sub-Clause 6.10 Records of Contractor’s Personnel and Equipment

Add the following:

The Contractor shall also submit the monthly returns as described in the Scope of Work, Part C3.5 Management, Clause 8

7 Plant, Materials and Workmanship

Sub-Clause 7.7 Ownership of Plant and Materials

Add the following after (b):

Notwithstanding points (a) and (b) above, the Contractor shall remain responsible for Plant and Materials that falls within the scope of the Contract. The Contractor shall protect the equipment against theft, damage, vandalism and unreasonable wear and tear whether the equipment is stored on-site, off-site or installed (not yet commissioned) at no additional cost to the client other than stipulated under General Requirements and Conditions until final commissioning and handover. Security is to be provided in terms of Section C3.4.9.2 (e) of the Contract Data. Insurance by the Contractor of this Plant and Material against these risks is also required to be included under Sub-Clause 18.2 (c).

8 Commencement, Delays and Suspension

Sub-Clause 8.1 Commencement of Work

Add the following at the end of the first paragraph:

Where the Contract Sum exceeds one hundred and thirty million Rand (R130,000,000.00), and a construction work permit from the Provincial Director of the Department of Labour is required, commencement of the Works shall not be deemed to take place until such construction work permit has been issued by the Provincial Director in terms of Clause 1.13 *[Compliance with Laws]*.

Delete the first paragraph.

Delete the words “the design and execution of the Works as soon as is reasonably practicable after” in the second paragraph and replace with “executing the Works within 14 days from”.

The Contractor will not be given access to, and possession of the Site, until the following documentation has been submitted and approved by the Engineer:

(a) Health and Safety Plan (refer to Clause G8.3 in the Health and Safety Specification included in Volume 3A
(b) Method Statements (refer to Clause H5.1 in the Environmental Management Specification in Volume Specification included in Volume 3A.
(c) Proof of Registration / Letter of Good Standing with the Metal & Engineering Industries Bargaining Council (MEIBC)

Sub-Clause 8.3 Programme

Delete the first sentence of the first paragraph and replace with:

The Contractor shall submit a detailed time programme to the Engineer within 14 days from the Commencement Date.

Add the following after the first paragraph:

The Contractor shall incorporate any programming restrictions that may be specified in Sub-Clause 2.1 in the Particular Conditions into the programme.

Sub-Clause 8.4 Extension of Time for Completion

Add the following after par (e):

Regarding sub-paragraph (c), no extension of the Time for Completion will be granted in respect of any delays attributed to normal climatic conditions. Normal climatic conditions shall be deemed to include normal rainfall and associated wet conditions and materials, strong winds and extremes of temperature. However, in the event that delays to critical activities exceed the number of working days listed below for each month, then exceptionally adverse climatic conditions shall be deemed to exist, and an extension of the Time for Completion shall be granted in accordance with the provisions of this Sub-Clause.

The number of days quoted below shall be regarded as a fair estimate of the delays to be anticipated and allowed for under normal climatic conditions where adverse weather prevents or disrupts critical work.

January	3 days
February	3 days
March	2 days
April	2 days
May	2 days
June	4 days
July	4 days
August	4 days

September	4 days
October	2 days
November	3 days
December	3 days

Sub-Clause 8.7 Delay Damages

Wherever the phrase “Delay Damages” occur in the Contract it should be replaced with the phrase “Delay Penalties”.

Insert the following at the end of the second sentence in the first paragraph:

….or, in the event of termination by the Employer under Sub-Clause 15.2 [*Termination by Employer*]*,* the actual date of termination.

Insert the following at the end of the second paragraph:

The Employer further has the right to deduct any other fines or penalties that become due under the Contract.

Sub-Clause 8.10 Payment for Plant and Materials in Event of Suspension

Replace sub-paragraph (b) with the following:

(b) the Contractor has provided an advance payment guarantee in accordance with Sub-Clause 14.2 in the Particular Conditions.

9 Tests on Completion

Sub-Clause 9.1 Contractor’s Obligations

Delete “21 days” in the first sentence of the second paragraph and replace with “14 days”.

10 Employer’s Taking Over

Sub-Clause 10.1 Taking Over of the Works and Sections

Delete 28 days in the 3rd and final paragraph and replace with 14 days

11 Defects Liability

Sub-Clause 11.3 Extension of Defects Notification Period

Delete the first paragraph and replace with:

The Employer shall be entitled subject to Sub-Clause 2.5 [*Employer’s Claims*] to an extension of the relevant Defects Notification Period for the Works or a Section if and to the extent that the Works or Section (as the case may be, and after taking-over) cannot be used for the purposes for which they are intended by reason of a defect or damage. However, a Defects Notification Period shall not be extended by more than five years.

13 Variations and Adjustments

Sub-Clause 13.3 Variation Procedure

Delete “and the Schedule of Payments” in the last paragraph.

Sub-Clause 13.5 Provisional Sums

Add the following to the last paragraph:

The number of quotations shall be three (3). Quotations shall include full technical descriptions as well as a breakdown of prices.

Sub-Clause 13.7 Adjustments for Changes in Legislation

Add the following to the first paragraph:

Any increase or decrease in the amount of Value Added Tax inserted in the Schedules of Quantities due to a change in the percentage rates applicable shall be the subject of adjustment under this Sub-Clause.

Sub-Clause 13.8 Adjustments for Changes in Cost

Deleted and replaced by:

13.8.1 General

The Accepted Contract Amount shall be deemed to have included amounts to cover the contingency of all other rises and falls in costs not covered by the provisions of this or other Clauses.

If provision has been made in the Appendix to Tender for prices to be subject to adjustment, such adjustments claimed by the Contractor shall be made in accordance with the Sub-Clauses referred to therein.

The following general provisions shall apply in all cases:

(a) The Base Date shall be as defined in Sub-Clause 1.1.3.1 in the Particular Conditions.

(b) Adjustments for changes in cost shall be calculated as if the Works are executed within the time for completion and no additional costs due to any work being executed outside the time for completion shall be payable unless the Engineer allows an extension of time in accordance with Sub-Clause 8.4 [*Extension of Time for Completion*] and Sub-Clause 8.4 in the Particular Conditions.

(c) Claims for adjustments for changes in cost shall be supported by such documentary evidence that may be required by the Engineer. Failure to render this information may result in the rejection of claims for price adjustment.

(d) The value of imported Plant and Materials shall be as defined in the sub-clause below.

(e) No claims for adjustments for changes in cost will be accepted which are submitted later than 28 days after the date of issue of the Taking-Over Certificate.

13.8.2 Plant and Materials Manufactured in South Africa

13.8.2.1 Permissible Adjustments

Adjustment to the Contract Price for the design, manufacture, painting, testing, supply, delivery, offloading and storage of Plant and Materials manufactured in the Republic of South Africa, shall be allowed **only** for variations in the cost of labour and material based on the indices published by the Steel and Engineering Industries Federation of South Africa (SEIFSA) using the method described in Sub-Clause 13.8.2.1.2.

The following SEIFSA tables shall be regarded as relevant to Mechanical and Electrical Works in this Contract:

Table C3	Index of actual labour cost
Table G	Statistics SA - production price index, Mechanical and Electrical Engineering Materials, as applicable
Table E -	**EX** Merchant Steel Price Index, Hot Rolled Sheets
Table Q -	**(A)** Index of stainless steel flat products (excluding imports), Hot rolled steel
Table Q -	**1 (A)** Corrosion resisting steel 3CR12, Hot rolled plate
Table N	Ruling price of certain electrical cable manufacturing materials, Copper rod 7,90 mm

13.8.2.2 Method of Price Adjustment

Adjustment of the total values inserted in the Schedules of Quantities for the design, manufacture, painting, testing, supply, delivery, offloading and storage of Plant and Materials manufactured in the Republic of South Africa shall be based on the following:

(a) The estimated proportions (represented by the coefficients “b”, “c”, “d” and “e” in the formulae in sub-paragraph (b) below) of the total values shall be adjusted on the basis of the increase or decrease between the indices in the relevant tables at the Base Date and these indices at a date 42 days prior to the valuation date, for each month in which the Plant and Materials are contractually delivered to Site, by multiplying the monthly values certified by the relevant Adjustment Factor in the formulae in sub-paragraph (b) below.

(b) the applicable formulae are:

Mechanical Plant and Materials

$$A = a + b\frac{Ln}{Lo} + c\frac{Mn}{Mo} + d\frac{Sn}{So} + e\frac{SSn}{SSo} - 1$$

where A = Adjustment Factor rounded off to the sixth decimal place
a = 0.10 Fixed coefficient (non-adjustable portion)
b = 0.15)
c = 0.35) Coefficients (sum of these coefficients shall be 0,90)
d = 0.25)
e = 0.15)
Ln = Current labour index in Table C3
Lo = Base labour index in Table C3
Mn = Current mechanical engineering materials index in Table G
Mo = Base mechanical engineering materials index in Table G
Sn = Current steel price index in Table E-EX
So = Base steel price index in Table E-EX
SSn = Current stainless steel index type 316 in Table Q-(A)
SSo = Base stainless steel index type 316 in Table Q-(A)

(COMPILER NOTE: specify stainless steel type if not 316)

"Current" indices are those applicable 42 days prior to date of claim, as stated in sub-paragraph (a) above

"Base" indices are those applicable at Base Date, as stated in sub-paragraph (a) above

Electrical Plant and Materials

$$A = a + b\frac{\mathbf{L}n}{\mathbf{L}o} + c\frac{\mathbf{E}n}{\mathbf{E}o} + d\frac{\mathbf{CR}n}{\mathbf{CR}o} + e\frac{\mathbf{C}n}{\mathbf{C}o} - 1$$

where A = Adjustment Factor rounded off to the sixth decimal place
a = 0.10 Fixed coefficient (non-adjustable portion)
b = 0.10)
c = 0.30) Coefficients (sum of these coefficients shall be 0,90)
d = 0.20)
e = 0.30)
Ln = Current labour index in Table C3
Lo = Base labour index in Table C3
En = Current electrical engineering materials index in Table G
Eo = Base electrical engineering materials index in Table G
CRn = Current 3CR12 steel index in Table Q -1 (A)
CRo = Base 3CR12 steel index in Table Q -1 (A)
Cn = Current copper rod index in Table N
Co = Base copper rod index in Table N

"Current" indices are those applicable 42 days prior to date of claim, as stated in sub-paragraph (a) above

"Base" indices are those applicable at Base Date, as stated in sub-paragraph (a) above

(c) The value of any Plant and Materials imported from outside South Africa inserted on the schedule titled "**Price Basis for Imported Plant and Material** and subject to Sub-Clause 13.8.2.2 (a) shall be deducted from the total values to be adjusted by the SEIFSA Index adjustment. Any Plant and Materials not inserted in Schedule 23 shall be deemed to be manufactured in South Africa for the purposes of Contract Price Adjustment.

13.8.2.3 Site Installation and General Items

For the purpose of this Sub-Clause, General Items (defined below) are included with Site Installation for the sake of convenience, and which otherwise have no relationship with each other.

General Items shall comprise General Requirements and Conditions, Health and Safety, Environmental Management, Sundries, and any other items so described or implied in the Schedules of Quantities to be adjusted under this Sub-Clause.

Adjustment of the total values inserted in the Schedules of Quantities for Site Installation and General Items, shall be based on the following:

(a) No Contract Price Adjustment shall be applied to the total values in respect of providing the Performance Security (Demand Guarantee under URDG 758) and Insurances.

(b) The estimated proportion (represented by the 0.90 coefficient in the formula in sub-paragraph (c) below) of the total values shall be adjusted on the basis of the increase or decrease between

SEIFSA **Table C3(A)** Index of actual labour cost (field force) where subsistence allowance is paid, at the Base Date and this index at the valuation date, for each month in which the work is contractually executed, by multiplying the monthly values certified by the Adjustment Factor in the formula in sub-paragraph (c) below.

(c) the applicable formula is:

Site Installation and General Items

$$A = 0.10 + 0.90 \frac{Ln}{Lo} - 1$$

where A = Adjustment Factor rounded off to the sixth decimal place
0.10 = Fixed coefficient (non-adjustable portion)
0.90 = Coefficient
Ln = Current labour index in Table C3(A)
Lo = Base labour index in Table C3(A)

"Current" index is that applicable at the valuation date, as stated in sub-paragraph (b) above

"Base" index is that applicable at Base Date, as stated in sub-paragraph (b) above

13.8.3 Plant and Materials Imported from Outside South Africa

13.8.3.1 If price adjustment for variations in the cost of plant and materials imported from outside of South Africa is required, such adjustment shall be based on the information contained on the schedule titled "**Price Basis for Imported Resources** and as below. For the purposes of this clause the Rand value of imported Plant and Materials inserted on the schedule titled "**Price Basis for Imported Resources** (column (F)) shall be the value in foreign currency (column (A)) converted to South African Rand (column (C)) by using the closing spot selling rate quoted by **Employer's** main banker, NEDBANK, on the Base Date (seven calendar days before tender closing date) rounded to the second decimal place (column(B)), to which shall be added any Customs Surcharge and Customs Duty applicable at that date (columns (D) and (E)).

13.8.3.1.1 Adjustment for variations in rates of exchange:

(a) The value in foreign currency inserted in column (A) shall be subject to clause (h) below when recalculating the Rand value.

(b) The rate of exchange inserted in column (B) shall be the closing spot selling rate quoted by Council's main banker, NEDBANK, on the Base Date, rounded to the second decimal place, subject to sub-paragraph (c) below.

(c) If the rate of exchange inserted by the Tenderer differs from the NEDBANK rate referred to above, then the NEDBANK rate shall apply and the Rand value in columns (C) and (F) shall be recalculated accordingly, without altering the price in the Schedules of Quantities for the relevant items.

(d) If a tender from a supplier or sub-contractor provides for variations in rates of exchange, the Contractor may **only** claim for variations in rates of exchange if he binds the supplier or sub-contractor to the same provision to take out forward cover as described in sub-paragraph (e) below.

(e) The Contractor (or supplier or sub-contractor) shall within five working days from the date of placing a firm order on an overseas supplier, cover or recover forward by way of a contract with a bank which is an authorised foreign exchange dealer, the foreign exchange component of the cost of any imported Plant and Materials inserted by the Tenderer on the schedule titled "**Price Basis for Imported Resources**.

(f) When the Contractor (or supplier or sub-contractor) so obtains forward cover, the Contractor shall immediately notify the Employer of the rate obtained and furnish the Employer with a copy of the foreign exchange contract note.

(g) Based on the evidence provided in sub-paragraph (f) above, the value in Rand inserted in column (C) of the schedule titled "**Price Basis for Imported Resources** shall be recalculated using the forward cover rate obtained, and any increase or decrease in the Rand value defined in this clause shall be adjusted accordingly, subject to sub-paragraph (h) below. Failure to provide such evidence shall result in no such recalculation shall be considered by the Employer.

(h) The adjustments shall be calculated upon the value in foreign currency in the Contractor's (or supplier's or sub-contractor's) **forward cover contract**, provided that, should this value exceed the value in foreign

currency inserted in column (A) of the schedule titled "**Price Basis for Imported Resources**, then the value in column (A) shall be used.

13.8.3.1.2 Adjustment for variations in customs surcharge and customs duty

(a) Any increase or decrease in the Rand value between the amounts of Customs Surcharge and Customs Duty inserted on the schedule titled "**Price Basis for Imported Resources** and those amounts actually paid to the Customs and Excise Authorities, which are due to changes in the percentage rates applicable or to the foreign exchange rate used by the authorities, shall be adjusted accordingly.

(b) The Tenderer shall state the Customs Duty Tariff Reference applicable to each item and the Contractor shall advise the Employer's Agent of any changes which occur.

13.8.3.1.3 Adjustment for variation in labour and material Costs

If the prices for imported Plant and Materials are not fixed, the Contractor shall in his Tender specify the formula for calculating Contract Price Adjustments normally used in the country of manufacture and the indices and relative proportions of labour and material on which his Tender prices are based. Evidence of the indices applicable shall be provided with each claim. The indices applicable 42 days before contractual dispatch date from the factory will be used for the purposes of Contract Price Adjustment.

Failure to specify a formula in the Tender shall mean that the prices are fixed or shall be deemed to be fixed.

a) Where the Contractor and the Contractor's international Supplier and/or Manufacturer secures an agreement by way of a Purchase Order (PO) to include the CPA value in the PO in the foreign currency quantum, a Forward Exchange Contract(s) [FEC] will be procured by the Contractor for the value of the Contractor's PO. When the equipment arrives on site, the international CPA will be calculated in ZAR by utilising a weighted average of the FOREX rates in the FEC's provided. No further/future FEC will be applicable for CPA payments.

b) Where the Contractor and the Contractor's international Supplier and/or Manufacturer secures an agreement whereby the Supplier/Manufacturer will claim the CPA at a later due to extended manufacturing lead times, FEC(s) required to secure will be procured by the Contractor to value in Column A of Schedule 23. A further/future FEC will be procured to pay the CPA (CPA FEC) which will become due to the Contractor's international Supplier/Manufacturer. The FOREX rate in CPA FEC will be utilised to calculate the ZAR value of the international CPA.

c) Sub-clause a) and b) are only applicable if all provisions of Clause 13.8.3.1.3 were adhered to at time of tender

14 Contract Price and Payment

Sub-Clause 14.1 The Contract Price

Delete sub-paragraph (d) and replace with:

(d) Price data in any Schedule, will be used for calculating the value of completed works for the purpose of interim payments or for determining the value of changes, omissions and additions for variation instructions when in the opinion of the Engineer such prices are applicable.

Add the following at the end of the Sub-clause:

(e) Except as otherwise stated in the Contract all parts of the Works are to be measured and the value agreed or determined, in accordance with Sub-Clause 3.5. Measurement shall be made of the net actual quantities of those parts, notwithstanding local practice.

Whenever the Engineer requires any part of the Works to be measured, reasonable notice shall be given to the Contractor's Representative, who shall:

(i) promptly either attend or send another qualified representative to assist the Engineer in making the measurement, and

(ii) supply any particulars requested by the Engineer.

If the Contractor fails to attend or send a representative, the measurement made by (or on behalf of) the Engineer shall be accepted as accurate.

(f) Except as otherwise stated in the Contract, wherever any Permanent Works are to be measured by records, they shall be prepared by the Engineer. The Contractor shall, as and when requested, attend to examine and agree the records with the Engineer, and shall sign the same when agreed. If the Contractor does not attend to examine and agree, these records shall be accepted as accurate.

If the Contractor examines and disagrees the records, and/or does not sign them as agreed, then the Contractor shall notify the Engineer of the respects in which the records are asserted to be inaccurate. After receiving this notice, the Engineer shall review the records and either confirm or vary them. If the Contractor does not so notify the Engineer within 14 days after being requested to examine the records, they shall be accepted as accurate.

(g) All measurements of quantity, length and mass for the purpose of payment shall be to the nearest standard unit for which rates are given in the Schedules of Quantities or have been agreed by the Engineer and shall be taken from the actual work on Site.

(h) Surplus or waste material will not be taken over or paid for by the Employer except where at the time when it was reasonable for the material to be provided or manufacture to be put in hand it was not possible to determine the quantity of material required. The route lengths determined by the Contractor in accordance with the specification shall be used for the purposes of manufacture in place of the estimated route lengths and any surplus after completion arising therefrom will not be taken over or paid for by the Employer unless the Employer so decides.

Sub-Clause 14.2 Advance Payment

Deleted and replaced by:

Subject to sub-paragraphs (a) and (e) of Sub-Clause 14.3 in the Particular Conditions, and the Advance Payment Schedule, the Employer shall make an advance payment for Plant and Materials stored at places other than the Site, or in respect of which a deposit with order is required, only once the Contractor has submitted an advance payment guarantee in accordance with this Sub-Clause, the authenticity of which has been verified by the City's Treasury Department.

Unless and until the Employer receives this guarantee, the following paragraphs shall not apply.

The Engineer shall issue an Interim Payment Certificate for, or including, advance payment after receiving a Statement under Sub-Clause 14.3 [*Application for Interim Payment Certificates*] and after the Employer has received a guarantee in an amount equal to the advance payment requested. This guarantee shall be issued by a financial institution approved by the Employer, as listed in the Annexure in Part C1.3 of the Contract Data, and shall be in the form of and shall contain the precise wording of the document included in Part C1.4: **Form of Advance Payment Guarantee** and shall come into force, be administered and expire in terms thereof**.**

The Employer shall return the guarantee to the Contractor within 14 days after the expiry date.

The provision of the Advanced Payment Guarantee shall be at the Contractor's cost.
he
The term "deposit" or "deposit with order" used in the context of this Sub-Clause and elsewhere by reference to this Sub-Clause, means a sum payable by the Contractor to a manufacturer/supplier prior to the manufacture of an item of Plant or Material, required at the time of placing an order, the balance of the value of the item being payable later.

Sub-Clause 14.3 Application for Interim Payment Certificates

Delete "in six copies" in the first line of the first paragraph.

Sub-Clause 14.5 Plant and Materials Intended for the Works

Add to (c)(ii):

or are ready to be delivered to site and the Engineer has instructed the Contractor to store the Plant and Materials until the site can accommodate their delivery, and are properly stored at the Contractor's or the sub-Contractor's Works, are protected against loss, damage or deterioration, and appear to be in accordance with the Contract and for which an advance payment guarantee has been provided in accordance with Sub-Clause 14.2 in the Particular Conditions. The advance payment guarantee shall be valid until the Plant and Materials are properly stored on Site and protected against loss, damage or deterioration.

Sub-Clause 14.6 Issue of Interim Payment Certificates

Delete "within 28 days" in the second sentence of the first paragraph and replace with "within 21 days".

Sub-Clause 14.7 Payment

Delete sub-paragraphs (a) to (c) and replace with:

(a) the amount certified in each Interim Payment Certificate within 35 days after the Engineer receives the Statement and supporting documents; and

(b) the amount certified in the Final Payment Certificate within 28 days after the Employer receives this Payment Certificate.

Add the following paragraph:

Notwithstanding the above, the Engineer shall be empowered to withhold the delivery of a payment certificate until the Contractor has complied with his obligations to submit the monthly returns in terms of Sub-Clause 6.10 in the Particular Conditions and as described in the Employer's Requirements.

The Contractor may submit a fully motivated application regarding more frequent payment to the Engineer to be submitted to the Employer for consideration. Requests for more frequent payments will be considered at the sole discretion of the Employer and is not a right in terms of this contract.

Sub-Clause 14.9 Payment of Retention Money

Delete the last paragraph and replace with:

The relevant contract value for each Section shall be determined by the Engineer, based on the Schedules of Quantities and any variations and adjustments thereto.

Sub-Clause 14.10 Statement at Completion

Delete "Within 84 days" in the first paragraph and replace with "Within 28 days,".

Delete "six copies of" in the first paragraph.

Sub-Clause 14.11 Application for Final Payment Certificate

Delete "Within 56 days" in the first paragraph and replace with "Within 14 days".

Delete "six copies of" in the first paragraph.

Add the following new Sub-Clause after Sub-Clause 14.5:

Sub-Clause 14.16 Tax Invoices

Section 20(1) of the Value Added Tax Act, 89 of 1991 requires that a supplier (person supplying goods or services) who is registered as a VAT vendor issue to the recipient a tax invoice within 21 days of the date of a supply whether requested or not.

The Contractor shall provide a tax invoice (VAT invoice) which shall be included with each Payment Certificate and a Final Payment Certificate delivered to the Employer by the Engineer in terms of Sub-Clause 14.6 [*Issue of Interim Payment Certificates*] and Sub-Clause 14.6 in the Particular Conditions, and Sub-Clause 14.13 [*Issue of Final Payment Certificate*], respectively. Failure by the Contractor to provide a tax invoice (VAT invoice) timeously may delay delivery of the payment certificate by the Engineer and no interest shall accrue.

Tax invoices may only be dated on or after the date of the relevant Payment Certificate as issued by the Engineer.

15 Termination by Employer

Add the following additional Sub-Clause after Sub-Clause (f)

(a) who was a Sole Proprietor, or a sole member of a Close Corporation dies

Insert the following after paragraph three:

The Employer may terminate the contract if a material irregularity vitiates the procurement process leading to the conclusion of the contract, rendering the procurement process and the conclusion of the resulting contract unfair, inequitable, non-transparent, uncompetitive or not cost-effective, provided the Employer follows the processes as described in its SCM Policy.

The Employer, without prejudice to any other remedy for breach of contract, by written notice of default sent to the supplier, may terminate the contract if the implementation of the contract may result in reputational risk or harm to the City as a result of (inter alia):

(a) reports of poor governance and/or unethical behaviour;
(b) association with known family of notorious individuals;
(c) poor performance issues, known to the Employer;
(d) negative social media reports; or
(e) adverse assurance (e.g. due diligence) report outcomes.

In addition to anything else contained in this contract, the Employer may make either of the following elections to ensure its rights are protected and any negative impact on service delivery is mitigated in the case of the insolvency of the Contractor:

(a) accept a contractor's proposal (via the trustee / liquidator) to render delivery utilising the appropriate contractual mechanisms; or

(b) terminate the contract, as the liquidator proposed contractor is deemed unacceptable to the employer, at any time by giving written notice to the contractor (via the trustee / liquidator).

16 Suspension and Termination by Contractor

Sub-Clause 16.1 Contractor's Entitlement to Suspend Work

Delete "Sub-Clause 2.4 [*Employer's Financial Arrangements*] or" in the first paragraph.

Sub-Clause 16.2 Termination by Contractor

Delete the content of sub-paragraph (a)

17 Risk and Responsibility

Sub-Clause 17.3 Employer's Risks

Add the following after sub-clause (h):

(i) defects in the materials supplied by the Employer for incorporation in the Works,

(j) the confiscation, commandeering, nationalisation, requisition or destruction of or damage to property by an order of government, or any public or local authority, and

(k) the amounts by which the replacement value of free issue materials exceeds the values as specified in the tender document by the Employer.

18 Insurance

Sub-Clause 18.1 General Requirements for Insurances

Add the following at the end of the first paragraph:

Save as otherwise provided in the Contract, nothing herein contained shall oblige the Insuring Party to effect any insurance which is not generally obtainable from a registered insurer in South Africa.

Add the following at the end of the second last paragraph:

The Insuring Party shall be liable for the payment of all deductibles.

Add the following at the end of Sub-Clause (a) before the comma:

"or an insurance broker's warranty worded precisely as given in Part C1.7 Insurance Broker's Warranty".

Sub-Clause 18.2 Insurance for Works and Contractor's Equipment

Add the following at the end of the first paragraph:
In addition to and in terms of the same conditions as the rest of this clause, the Insuring Party shall further provide special risks / supplementary insurance issued by the South African Special Risks Insurance Association (SASRIA) in respect of civil commotion, riot and strike in the same value as the works insurance.

Delete "Sub-Clause 18.2 [(e) (i) and (ii)] ".

Sub-clause 18.3 Insurance against Injury to Persons and Damage to Property

Add the following at the end of the first paragraph:

In addition to and in terms of the same conditions as the rest of this clause, the Insuring Party shall provide Motor Vehicle Liability Insurance comprising (as a minimum) "Balance of Third Party" Risks including Passenger Liability Indemnity.

Sub-Clause 18.4 Insurance of Contractor's Personnel

Add the following at the end of the first paragraph:

This insurance shall be in terms of the provisions of the Compensation for Occupational Injuries and Diseases Act, 130 of 1993.

20 Claims, Disputes and Arbitration

Sub-Clause 20.5 Amicable Settlement

Add the following after the first paragraph:

Any amicable settlement conducted in terms of this clause will be done by mediation in accordance with rules determined by the mediator. Where the parties fail to agree on a mediator, the mediator shall be appointed by the entity or official named in the Appendix to Tender.

Mediation shall be conducted without legal representation with the costs being borne equally by the parties.

The parties shall record any agreement reached in writing and thereafter they shall be bound by such agreement.

The mediator shall be authorized to end the mediation process whenever, in his opinion, further efforts at mediation would not contribute to a resolution of the dispute between the parties.

If the mediation fails, then either party may require that the dispute be settled by litigation.

Delete all references to "Arbitration" in the conditions and replace it with "Litigation"

Delete Sub-Clause 20.6 and replace with the following:

Sub-Clause 20.6 Litigation

Any unresolved dispute shall be finally determined by court proceedings in the Court as stated in the Appendix to Tender.

ADVANCE PAYMENT SCHEDULE

This Advance Payment Schedule is to be read in conjunction with Sub-Clauses 14.2 and 14.3 (sub-paragraphs (a) and (e)) in the Particular Conditions. The purpose of this schedule is to itemise specific Plant and Materials not yet brought on to the Site for building into the Permanent Works and for which the Employer is prepared to make advance payments to the Contractor, subject to the conditions below.

The items of Plant and Materials which have been identified by the Employer as being suitable for advance payment in terms of the Contract are listed in the table below. Should an item or items be added to the list at tender stage by a tenderer, such item(s) will not be binding on the Employer.

Plant and Materials which have been manufactured and are stored at places other than the Site:	**Plant and Materials yet to be manufactured and for which a deposit with order is required from the Contractor by a manufacturer/supplier, and which may be stored at places other than the Site after manufacture:**
Steel bridges for settling tanks	Screw pumps and mechanical screens at inlet works.
Electrical distribution boards	FBDA Blowers.
Alternator sets	UV disinfection equipment and UV upstream mechanical screens.
Variable frequency drives (VFDs)	Primary sludge screen presses.
	Dewatering equipment (linear screens and belt presses).
	CHP engines and gas scrubbing equipment.
	Boilers, heat exchangers and heat recovery units.
	Sludge pumps and recirculation equipment.

Conditions:

1) The Contractor can only rely on advance payment being permitted by the Employer in respect of the Plant and Materials listed in the table above, and in respect of condition 5) below. The Employer may, however, permit advance payment for other Plant and Materials in exceptional circumstances and at its sole discretion, during the course of the Contract, and upon reasonable request from the Contractor.
2) Advance payment for the purposes of deposits will only be provided up to a limit of 50% of the value of any one item being claimed.
3) The Contractor shall provide the Employer with documentary evidence of the terms and conditions for which a deposit with order is required by a manufacturer/supplier, together with the advance payment guarantee.
4) The Contractor will also be permitted to obtain advance payment for the balance of the value of the Plant and Materials in respect of which he has paid a deposit, for an item which after manufacture is stored at a place other than the Site. The Contractor shall, in respect of such payment, provide an advance payment guarantee, either for such balance or, if the advance payment guarantee in respect of the deposit is to be returned by the Employer upon request, for the whole value of the item.
5) In the event of suspension in terms of Sub-Clause 8.10 in the General and Particular Conditions, as referred to in sub-paragraph (a) in Sub-Clause 14.3 in the Particular Conditions, the Employer shall also permit advance payment for Plant and Materials which have not been delivered to Site, subject also to the terms of Sub-Clause 14.2 in the Particular Conditions.

2.

C1.3 Form of Performance Guarantee

PERFORMANCE GUARANTEE

For use with the Conditions of Contract as described in C1.2: Contract Data Part 1: Contract Data provided by the Employer.

GUARANTOR DETAILS AND DEFINITIONS

"Guarantor" means: .....

"Physical address: .....

"Employer" means: The City of Cape Town, WATER AND SANITATION.

"Contractor" means: .....

"Engineer" means: .....

“Works” means: **CONTRACT NO. 191Q/2023/24: DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS**

"Site" means: The site as defined in the Contract Data.

"Contract" means: The Agreement made in terms of the Form of Offer and Acceptance and such amendments or additions to the Contract as may be agreed in writing between the parties.

"Contract Sum" means: The accepted amount inclusive of tax of R .....

Amount in words: .....

"Guaranteed Sum" means: The maximum aggregate amount of R.....

Amount in words: .....

"Expiry Date" means: The date of issue by the Engineer of the Performance Certificate.

CONTRACT DETAILS

Engineer issues: Interim Payment Certificates, Final Payment Certificate and the Performance Certificate as defined in the Contract.

PERFORMANCE GUARANTEE

1. The Guarantor's liability shall be limited to the amount of the Guaranteed Sum.

2. The Guarantor's period of liability shall be from and including the date of issue of this Performance Guarantee and up to and including the Expiry Date or the date of payment in full of the Guaranteed Sum, whichever occurs first. The Engineer and/or the Employer shall advise the Guarantor in writing of the date on which the Performance Certificate has been issued.

3. The Guarantor hereby acknowledges that:

3.1 any reference in this Performance Guarantee to the Contract is made for the purpose of convenience and shall not be construed as any intention whatsoever to create an accessory obligation or any intention whatsoever to create a suretyship;

3.2 its obligation under this Performance Guarantee is restricted to the payment of money.

4. Subject to the Guarantor's maximum liability referred to in 1, the Guarantor hereby undertakes to pay the Employer the sum certified upon receipt of the documents identified in 4.1 to 4.3:

4.1 A copy of a first written demand issued by the Employer to the Contractor stating that payment of a sum certified by the Engineer in an Interim or Final Payment Certificate has not been made in terms of the Contract and failing such payment within seven (7) calendar days, the Employer intends to call upon the Guarantor to make payment in terms of 4.2;

4.2 A first written demand issued by the Employer to the Guarantor at the Guarantor's physical address with a copy to the Contractor stating that a period of seven (7) calendar days has elapsed since the first written demand in terms of 4.1 and the sum certified has still not been paid;

4.3 A copy of the aforesaid payment certificate which entitles the Employer to receive payment in terms of the Contract of the sum certified in 4.

5. Subject to the Guarantor's maximum liability referred to in 1, the Guarantor undertakes to pay to the Employer the Guaranteed Sum or the full outstanding balance upon receipt of a first written demand from the Employer to the Guarantor at the Guarantor's physical address calling up this Performance Guarantee, such demand stating that:

5.1 the Contract has been terminated due to the Contractor's default and that this Performance Guarantee is called up in terms of 5; or

5.2 a provisional or final sequestration or liquidation court order has been granted against the Contractor and that the Performance Guarantee is called up in terms of 5; and

5.3 the aforesaid written demand is accompanied by a copy of the notice of termination and/or the provisional/final sequestration and/or the provisional liquidation court order.

6. It is recorded that the aggregate amount of payments required to be made by the Guarantor in terms of 4 and 5 shall not exceed the Guarantor's maximum liability in terms of 1.

7. Where the Guarantor has made payment in terms of 5, the Employer shall upon the date of issue of the Final Payment Certificate submit an expense account to the Guarantor showing how all monies received in terms of this Performance Guarantee have been expended and shall refund to the Guarantor any resulting surplus. All monies refunded to the Guarantor in terms of this Performance Guarantee shall bear interest at the prime overdraft rate of the Employer's bank compounded monthly and calculated from the date payment was made by the Guarantor to the Employer until the date of refund.

8. Payment by the Guarantor in terms of 4 or 5 shall be made within seven (7) calendar days upon receipt of the first written demand to the Guarantor.

9. 9. The Employer shall have the absolute right to arrange his affairs with the Contractor in any manner which the Employer may deem fit and the Guarantor shall not have the right to claim his release from this Performance Guarantee on account of any conduct alleged to be prejudicial to the Guarantor.

10. The Guarantor chooses the physical address as stated above for the service of all notices for all purposes in connection herewith.

11. This Performance Guarantee is neither negotiable nor transferable and shall expire in terms of 2, whereafter no claims will be considered by the Guarantor. The original of this Guarantee shall be returned to the Guarantor after it has expired.

12. This Performance Guarantee, with the required demand notices in terms of 4 or 5, shall be regarded as a liquid document for the purposes of obtaining a court order.

13. Where this Performance Guarantee is issued in the Republic of South Africa the Guarantor hereby consents in terms of Section 45 of the Magistrate's Courts Act No 32 of 1944, as amended, to the jurisdiction of the Magistrate's Court of any district having jurisdiction in terms of Section 28 of the said Act, notwithstanding that the amount of the claim may exceed the jurisdiction of the Magistrate's Court.

Signed at .....

Date .....

Guarantor's signatory (1) .....

Capacity .....

Guarantor's signatory (2) .....

Capacity .....

Witness signatory (1) .....

Witness signatory (2) .....

ANNEXURE

CONTRACT GUARANTEES POLICY APPROVED INSTITUTIONS

The following financial institutions are currently (as at 28 February 2023) approved for issue of contract guarantees to the City:

National Banks:
ABSA Bank Limited
FirstRand Bank Limited
Investec Bank Limited
Nedbank Limited
Standard Bank of South Africa Limited

International Banks (with branches in South Africa):
Barclays Bank PLC
Citibank NA
Credit Agricole Corporate and Investment Bank
HSBC Bank PLC
JP Morgan Chase Bank
Societe Generale
Standard Chartered Bank

Insurance Companies:
American International Group Inc (AIG)
Bryte Insurance Company Limited
Coface SA
Compass Insurance Company Limited
Credit Guarantee Insurance Corporation of Africa Limited
Guardrisk Insurance Company Limited
Hollard Insurance Company Limited
Infiniti Insurance Limited
Lombard Insurance Company Limited
Mutual and Federal Risk Financing Limited
New National Assurance Company Limited
PSG Konsult Ltd (previously Absa Insurance)
Regent Insurance Company Limited
Renasa Insurance Company Limited
Santam Limited

C1.4 Form of Advance Payment Guarantee

ADVANCE PAYMENT GUARANTEE

For use with the Conditions of Contract as described in C1.2: Contract Data Part 1: Contract Data provided by the Employer

GUARANTOR DETAILS AND DEFINITIONS

"Guarantor" means: .....

"Physical address: .....

"Employer" means: The City of Cape Town WATER AND SANITATION

"Contractor" means: .....

"Engineer" means: .....

“Works” means: **CONTRACT NO. 191Q/2023/24: DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS**

"Site" means: The site as defined in the Contract Data.

"Contract" means: The Agreement made in terms of the Form of Offer and Acceptance and such amendments or additions to the Contract as may be agreed in writing between the parties.

"Plant and Materials" means: The Plant and Materials stored at places other than the Site, or in respect of which an advance payment prior to manufacture is required, which the Employer has agreed may be subject to advance payment, such Plant and Materials being listed in the Schedule of Plant and Materials.

“Schedule of Plant and Materials” means: A list of Plant and Materials which shows the value thereof to be included in the Guaranteed Advance Payment Sum.

"Guaranteed Advance Payment Sum" means: The maximum aggregate amount of R .....

Amount in words: .....

"Expiry Date" means: The date of the payment certificate wherein the Plant and Materials have been certified by the Engineer as having been built into the Permanent Works.

CONTRACT DETAILS

Engineer issues: Interim Payment Certificates and Final Payment Certificate.

ADVANCE PAYMENT GUARANTEE

1. The Guarantor's liability shall be limited to the amount of the Guaranteed Advance Payment Sum.

2. The Guarantor's period of liability shall be from and including the date of issue of this Advance Payment Guarantee and up to and including the Expiry Date or the date of payment in full of the Guaranteed Advanced Payment Sum, whichever occurs first.

3. The Guarantor hereby acknowledges that:

3.1 any reference in this Advance Payment Guarantee to the Contract is made for the purpose of convenience and shall not be construed as any intention whatsoever to create an accessory obligation or any intention whatsoever to create a suretyship;

3.2 its obligation under this Advance Payment Guarantee is restricted to the payment of money.

4. Subject to the Guarantor's maximum liability referred to in 1, the Guarantor hereby undertakes to pay the Employer the sum certified upon receipt of the documents identified in 4.1 to 4.3:

4.1 A copy of a first written demand issued by the Employer to the Contractor stating that payment of a sum certified by the Engineer in an Interim or Final Payment Certificate has not been made in terms of the Contract and failing such payment within seven (7) calendar days, the Employer intends to call upon the Guarantor to make payment in terms of 4.2;

4.2 A first written demand issued by the Employer to the Guarantor at the Guarantor's physical address with a copy to the Contractor stating that a period of seven (7) calendar days has elapsed since the first written demand in terms of 4.1 and the sum certified has still not been paid;

4.3 A copy of the aforesaid payment certificate which entitles the Employer to receive payment in terms of the Contract of the sum certified in 4.

5. Subject to the Guarantor's maximum liability referred to in 1, the Guarantor undertakes to pay to the Employer the Guaranteed Advance Payment Sum or the full outstanding balance upon receipt of a first written demand from the Employer to the Guarantor at the Guarantor's physical address calling up this Advance Payment Guarantee, such demand stating that:

5.1 the Contract has been terminated due to the Contractor's default and that this Advance Payment Guarantee is called up in terms of 5; or

5.2 a provisional or final sequestration or liquidation court order has been granted against the Contractor and that the Advance Payment Guarantee is called up in terms of 5; and

5.3 the aforesaid written demand is accompanied by a copy of the notice of termination and/or the provisional/final sequestration and/or the provisional liquidation court order.

6. It is recorded that the aggregate amount of payments required to be made by the Guarantor in terms of 4 and 5 shall not exceed the Guarantor's maximum liability in terms of 1.

7. Payment by the Guarantor in terms of 4 or 5 shall be made within seven (7) calendar days upon receipt of the first written demand to the Guarantor.

8. 8. The Employer shall have the absolute right to arrange his affairs with the Contractor in any manner which the Employer may deem fit and the Guarantor shall not have the right to claim his release from this Advance Payment Guarantee on account of any conduct alleged to be prejudicial to the Guarantor.

9. The Guarantor chooses the physical address as stated above for the service of all notices for all purposes in connection herewith.

10. This Advance Payment Guarantee is neither negotiable nor transferable and shall expire in terms of 2, whereafter no claims will be considered by the Guarantor. The original of this Guarantee shall be returned to the Guarantor after it has expired.

11. This Advance Payment Guarantee, with the required demand notices in terms of 4 or 5, shall be regarded as a liquid document for the purposes of obtaining a court order.

12. Where this Advance Payment Guarantee is issued in the Republic of South Africa the Guarantor hereby consents in terms of Section 45 of the Magistrate's Courts Act No 32 of 1944, as amended to the jurisdiction of the Magistrate's Court of any district having jurisdiction in terms of Section 28 of the said Act, notwithstanding that the amount of the claim may exceed the jurisdiction of the Magistrate's Court.

Signed at .....

Date .....

Guarantor's signatory (1) .....

Capacity .....

Guarantor's signatory (2) .....

Capacity .....

Witness signatory (1) .....

Witness signatory (2) .....

CITY OF CAPE TOWN

DIRECTORATE: WATER AND SANITATION

CONTRACT NO. 191Q/2023/24

DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS

C1.5 Occupational Health and Safety Agreement

AGREEMENT MADE AND ENTERED INTO BETWEEN THE CITY OF CAPE TOWN (HEREINAFTER CALLED THE "EMPLOYER") AND

……..……. ,
(Contractor/Mandatary/Company/CC Name)

IN TERMS OF SECTION 37(2) OF THE OCCUPATIONAL HEALTH AND SAFETY ACT, 85 OF 1993 AS AMENDED.

I, ……..……. , representing

……..……. , as an employer
in its own right, do hereby undertake to ensure, as far as is reasonably practicable, that all work will be performed, and all equipment, machinery or plant used in such a manner as to comply with the provisions of the Occupational Health and Safety Act (OHSA) and the Regulations promulgated thereunder.

I furthermore confirm that I am/we are registered with the Compensation Commissioner and that all registration and assessment monies due to the Compensation Commissioner have been fully paid or that I/We are insured with an approved licensed compensation insurer.

COID ACT Registration Number: ……..

OR Compensation Insurer: ..... Policy No.: .....

I undertake to appoint, where required, suitable competent persons, in writing, in terms of the requirements of OHSA and the Regulations and to charge him/them with the duty of ensuring that the provisions of OHSA and Regulations as well as the Council's Special Conditions of Contract, Way Leave, Lock-Out and Work Permit Procedures are adhered to as far as reasonably practicable.

I further undertake to ensure that any subcontractors employed by me will enter into an occupational health and safety agreement separately, and that such subcontractors comply with the conditions set.

I hereby declare that I have read and understand the Occupational Health and Safety Specification contained in this tender and undertake to comply therewith at all times.

I hereby also undertake to comply with the Occupational Health and Safety Specification and Plan submitted and approved in terms thereof.

Signed at .....on the.....day of.....20….

_____ _____
Witness **Mandatary**

Signed at ..... on the.....day of.....20 ....

_____ _____
Witness for and on behalf of
City of Cape Town

CITY OF CAPE TOWN

DIRECTORATE: WATER AND SANITATION

CONTRACT NO. 191Q/2023/24

DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS

C1.6 Protection of the Environment Declaration

PROTECTION OF THE ENVIRONMENT DECLARATION

The Contractor will not be given right of access to the Site until this form has been signed

CONTRACT NO.**: 191Q/2023/24**

CONTRACT TITLE: **DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS**

I/ we,.....{Contractor} record as follows:

1. I/ we, the undersigned, do hereby declare that I/ we am/ are aware of the increasing requirement by society that construction activities shall be carried out with due regard to their impact on the environment.

2. In view of this requirement of society and a corresponding requirement by the Employer with regard to this Contract, I/ we will, in addition to complying with the letter of the terms of the Contract dealing with protection of the environment, also take into consideration the spirit of such requirements and will, in selecting appropriate employees, plant, materials and methods of construction, in-so-far as I/ we have the choice, include in the analysis not only the technical and economic (both financial and with regard to time) aspects but also the impact on the environment of the options. In this regard, I/ we recognise and accept the need to abide by the "precautionary principle" which aims to ensure the protection of the environment by the adoption of the most environmentally sensitive construction approach in the face of uncertainty with regard to the environmental implications of construction.

3. I/ we declare that I/ we have read and understood the contents of the Environmental Management Programme (which is comprised of the Environmental Management Specification and its Annexures) for this Contract, and that I/ we understand my/our responsibilities in terms of enforcing and implementing the Environmental Management Programme. I/ we also declare that I/ we have made appropriate provision in my/ our pricing of the Schedules of Quantities items for the Environmental Management Programme.

4. I/ we acknowledge and accept the right of the Employer to deduct, should he so wish, from any amounts due to me/ us, such amounts (hereinafter referred to as fines) as the Engineer shall certify as being warranted in view of my/ our failure to comply with the terms of the Contract dealing with protection of the environment, subject to the following:

4.1 The Engineer, in determining the amount of such fine, shall take into account, *inter alia*, the nature of the offence, the seriousness of its impact on the environment, the degree of prior compliance/non-compliance, the extent of the Contractor's overall compliance with environmental protection requirements and, in particular, the extent to which he considers it necessary to impose a sanction in order to eliminate/reduce future occurrences

4.2 The Engineer shall, with respect to any fine imposed, provide me/ us with a written statement giving details of the offence, the facts on which the Engineer has based his assessment and the terms of the Contract (by reference to the specific clause) which has been contravened.

Signed ..... Date.....
CONTRACTOR

CITY OF CAPE TOWN

DIRECTORATE: WATER AND SANITATION

CONTRACT NO. 191Q/2023/24

DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS

C1.7 Insurance Broker's Warranty

Pro Forma

Logo

Letterhead of Contractor's Insurance Broker

Date _____

CITY OF CAPE TOWN
City Manager
Civic Centre
12 Hertzog Boulevard
Cape Town
8001

Dear Sir

CONTRACT NO.: **191Q/2023/24**

CONTRACT TITLE: **DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS**

NAME OF CONTRACTOR:_____

I, the undersigned, do hereby confirm and warrant that all the insurances required in terms of the abovementioned contract have been issued and/or in the case of blanket/umbrella policies, have been endorsed to reflect the interests of the CITY OF CAPE TOWN with regard to the abovementioned contract, and that all the insurances and endorsements, etc., are all in accordance with the requirements of the contract.

I furthermore confirm that all premiums in the above regard have been paid.

Yours faithfully

Signed: _____

For: _____

CITY OF CAPE TOWN

DIRECTORATE: WATER AND SANITATION

CONTRACT NO. 191Q/2023/24

DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS

C1.8 Contract of Temporary Employment as Community Liaison Officer

Construction Contract No.: 191Q/2023/24

PROJECT: DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS

AGREEMENT made between the CONTRACTOR.....
and the Community Liaison Officer……, hereafter referred to as the CLO, for the appointment and employment of a CLO for the duration of the work in respect of the above named construction contract.

1. **THE PARTIES HAVE AGREED THAT**

The CLO will be employed by the CONTRACTOR on a temporary basis for the duration of the work from the date of signing this agreement to the date of practical completion as defined in the Contract, subject to all the conditions set out below.

2. **THE DUTIES OF THE COMMUNITY LIAISON OFFICER SHALL BE:**

1. to keep the community informed on the progress of the project;
2. to keep the Contractor informed on relevant Community affairs and possible grievances;
3. to manage the recruitment of workers from the Sub-Council Job-Seekers Database;
4. to assist the Contractor's supervisory staff in the management of the workers.

3. **THE FOLLOWING CONDITIONS OF EMPLOYMENT SHALL APPLY:**

The Conditions of Temporary Employment as applicable on this Contract for the workers recruited from the Community shall apply equally to the CLO, except that the rate of remuneration shall be R 462 per working day. These conditions that apply are listed below as they appear in the Contract of Temporary Employment:

3.1 If required to work on a statutory public holiday or Sunday the payment will be double the amount stated in the previous paragraph.

3.2 Maximum hours of work:

(i) 9¼ hours per day
(ii) 45 hours per week;
(iii) 5 days per week;
(iv) 5 hours without an interval, whereupon there shall be an interval of at least 30 minutes;
(v) A spread-over period of 12 hours.

3.3 The CLO shall be entitled to payment where he is prevented from working by reasons which are within the control of the Contractor.

3.4 On days when it is raining the Contractor may, before 9 a.m., decide not to open the site and there will be no pay.

If the Contractor closes the site between 9 a.m. and 1 p.m., the CLO will be paid half the daily wage.

If the site works later than 1 p.m., the CLO will be paid the full daily wage.

PART C2: PRICING DATA

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C2.1 Pricing Assumptions

Pricing Assumptions mean the criteria as set out below, read together with all Parts of this contract document, which it will be assumed in the contract, that the tenderer has taken into account when developing his prices.

1. Pricing of Mechanical and Electrical Works shall be conducted in the following manner:

   a. Design and Drawings
   With reference to clause 5 [Design] of the General Conditions of Contract, the Contractor shall carry out and be responsible for the design of the Works and the tenderer shall include, under the respective payment items for Design and Drawings for the detail design and submission of associated General Arrangement (GA), Process and Instrumentation Diagrams (P&IDs), workshop drawings and equipment data packs for the respective equipment and/or system.

   The Engineer's design included in the tender shall be seen as conceptual in nature for tendering purposes and hence detailed designs shall be required for all equipment and/or systems included in the tender in accordance with the Employer's Requirements.

   b. Manufacture, supply and delivery to Site
   The prices quoted for the manufacture and supply of plant and equipment shall make provision for:
   - Supply of all materials, labour and plant required for manufacturing purposes;
   - Application of any/all factory-applied corrosion protection;
   - Execution of any/all factory-acceptance testing;
   - Loading, handling, shipping, transport, delivery to and off-loading at the Site;
   - Double handling in cases where immediate installation is not possible.
   - All relevant fixing hardware (i.e. nuts, bolts, washers, gaskets etc.)

   Unless otherwise specified, the attendance of any factory-acceptance tests outside the border of South Africa by the Engineer and Employer shall not be required.

   c. Installation
   The prices quoted for erection and/or installation shall make provision for:
   - Supply of all rigging and associated equipment for the handling, alignment and fixing in final position;
   - Repair of damaged corrosion protection;
   - Painting as per specified colour coding;
   - Supply and installation of first charge consumable i.e. oil, grease etc.;
   - Guaranteeing for the period of the defects notification period
   - Full servicing, including replacement of all consumables, at the end of the defects notification period.

   If the supply of the first charge chemicals (ferric chloride, poly electrolyte etc.) is required a separate payment item shall be provided.

   d. Testing and Commissioning
   The prices quoted for the testing and commissioning of equipment and/or systems shall make provision for the supply of all required testing apparatus, drafting of functional design specifications and testing plans, attendance on Site of any/all commissioning experts and specialists, operating, mechanical and electrical testing, adjusting, optimizing in order to commence with the Trial Operation Period (if applicable) or handing over in proper working condition.

   e. Trial Operation Period
   Unless otherwise specified, a Trial Operation Period shall be applicable to the Contract and adequate allowance shall be made in terms of costs, resources and programming. The requirements of the Trial Operation Period shall be included under Project Specification.

   f. Scope
   The Employer reserves the right to sub-divide the contract or omit certain portions thereof. Prices quoted under a specific Section or Schedule shall be deemed to apply to that Section or section of work only.

2. Descriptions in the Schedules of Quantities are abbreviated and comply generally with those in the Standardised Specifications. The applicable clause of each Standardised Specification, read together with the relevant clauses of the Scope of Work, set out what ancillary or associated activities are included in the rates for the operations

specified. Should any requirements of the measurement and payment clause of the applicable Standardised Specification, or the Scope of Work, conflict with the terms of the Schedule, the requirements of the Standardised Specification or Scope of Work, as applicable, shall prevail.

3. The measurement and payment clauses in a specification in which further information regarding the scheduled items is given, are referenced under “chief reference” in the Schedules of Quantities. The referenced clauses are not necessarily the only sources of information in respect of scheduled items. Further information and specifications may be found elsewhere in the contract documents.

4. Unless otherwise stated, items are measured net in accordance with the drawings, and no allowance is made for waste.

5. The quantities set out in the Schedules of Quantities are the estimated quantities of the Contract Works, but the Contractor will be required to undertake whatever quantities may be directed by the Employer’s Agent from time to time. The Contract Price for the completed contract shall be computed from the actual quantities of work done, valued at the relevant unit rates and prices.

6. The prices and rates to be inserted in the Schedule of Quantities are to be the full inclusive prices for the work described under the several items. Such prices and rates shall cover all costs and expenses that may be required in and for the execution of the work described, and shall cover the cost of all general risks, liabilities, and obligations set forth or implied in the documents on which the tender is based, as well as overhead charges and profit. Reasonable prices shall be inserted as these will be used as a basis for assessment of payment for additional work that may have to be carried out.

7. A price or rate should be entered against each item in the Schedules of Quantities, whether the quantities are stated or not. **An item against which no rate is/are entered, or if anything other than a rate or a nil rate (for example, a zero, a dash or the word “included” or abbreviations thereof) is entered against an item, it will also be regarded as a nil rate having been entered against that item, i.e. that there is no charge for that item.** The Tenderer may be requested to clarify nil rates, or items regarded as having nil rates; and the Employer may also perform a risk analysis with regard to the reasonableness of such rates.

8. Except where rates only are required, insert all amounts to be included in the total tendered price in the "Amount" column and show the corresponding total tendered price.

9. Items have been provided where any further items considered necessary by the Tenderer can be priced. The Tenderer must provide full details of what has been allowed for with his Tender under these items.

10. The units of measurement described in the Schedule of Quantities are metric units. Abbreviations which may be used in these Schedule of Quantities are as follows:

No.	=	number
Item/Sum	=	lump sum
Prov	=	Provisional sum
PC sum	=	prime cost sum
%	=	per cent
Days	=	“Day” as defined in the Conditions of Contract
hrs	=	Hours
m	=	metre
cubicm	=	cubic metre
sqmm	=	square millimeter
m3-month	=	cubic metre per month

Prime Cost Sum

a) Description of Item to which Prime Cost Sum Applies……. ….. Unit : PC Sum

b) Charge Required by Contractor on Sub-item (a) above …….…….. Unit : %

The Contractor shall be reimbursed under sub-item(s) (a) in substitution of the respective Prime Cost Sums included in the Contract, the actual price(s) paid or payable by him in respect of the goods, materials or services supplied by others, but excluding any charges for the Contractor’s labour, profit, carriage, establishment or other charges related to such goods, services or materials.

The Contractor shall be paid under sub-item (b), the respective percentage, as stated by the Contractor in its Tender, of the amount certified by the Engineer for payment under the related sub-item (a). The percentages tendered by the Contractor for each respective sub-item (b) included in the Bill of Quantities shall be deemed to in full and final compensation to the Contractor in respect of any charge by the Contractor for labour, carriage profit, establishment and for any other charges related to the goods, services or materials supplied under the related sub-item (a).

If the Contractor shall have omitted within its Tender to insert a tendered percentage under sub-item (b), or tendered a zero percentage, the Contractor’s tendered rate for sub-item (b) shall be deemed to be zero and the Contractor shall not be entitled to any payment under sub-item (b).

11. Where fractions of a cent occur in calculations of prices and amounts, they shall be rounded up/down to the nearest whole cent.

12. The Tenderer is referred to C.2.24 in Part T1.2 Tender Data regarding the pricing of Deviations and/or Qualifications.

    Clause C.2.13.11 c) in Part T1.2 Tender Data shall be applicable to the submission of Schedules of Quantities which have been priced electronically, and which the Tenderer wishes to submit as a printed version with his/her tender in the place of handwritten priced Schedule of Quantities.

    If there is found to be any variance between the printed version and the original issued document, the original shall stand. However, where Addenda have been issued which amend the Schedules of Quantities, then the printed Schedules of Quantities shall take these into account.

    The pages of the issued Schedules of Quantities should not be removed from the tender document.

13. Tenderers are referred to Clause 8 Measurement and Payment in the Environmental Management (EM) Specification in Part C3.5 in the Scope of Work for the basic principles of measurement and pricing of the EM Specification.

14. All descriptions or clauses where trade names or proprietary products are specified, are deemed to include the phrase "or equal approved"

15. Tenderers are referred to Sub-Clause 13.8 in the Appendix to Tender in Part C1.2 Contract Data regarding contract price adjustment.

16. Design of the Works, Contractor's Documents (including "as built" drawings and Manual), and design for the manufacture of materials and equipment, must be priced and will be paid for as follows:

    a) An item is provided in the Schedules of Quantities (Schedule No. P&Gs, General Requirements and Conditions) for Design of the Works and submission of Contractor's Documents – this item includes *inter alia* the Contractor's obligations under Clause 2 in Part C3.2 Engineering, up to Sub-Clause 2.3.

    b) Items are provided in the Schedules of Quantities (Schedule No. M34, Sundries) for Providing "as built" drawings, and draft and final copies of the Installation, Operation and Maintenance Manuals – these items cover the Contractor's obligations under Clause 2 in Part C3.2 Engineering, Sub-Clauses 2.4 and 2.5.

    c) Items of materials and equipment are provided in the Schedules of Quantities under headings containing the words "design, manufacture, painting, testing, supply, delivery, offloading and storage" – "design" in these items will usually only be paid upon supply of the materials and equipment, but may be paid for separately at the discretion of the Engineer.

PART C3: SCOPE OF WORK

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CITY OF CAPE TOWN

DIRECTORATE: WATER AND SANITATION

CONTRACT NO. 191Q/2023/24

DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS

C3.1 Description of the Works

CONTENTS

3.1.1 EMPLOYER'S OBJECTIVES
3.1.2 OVERVIEW OF THE WORKS
3.1.3 EXTENT OF THE WORKS
3.1.4 LOCATION OF THE WORKS
3.1.5 TEMPORARY WORKS
3.1.6 DESCRIPTION OF SITE AND CONDITIONS
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3.1.9 WORK TO BE CARRIED OUT BY OTHERS (UNDER SEPARATE CONTRACTS)
3.1.10 PROCESS CONTROL: ASSISTANCE, MAINTENANCE AND TRAINING PERIOD

3.1.1 EMPLOYER'S OBJECTIVES

The existing Macassar wastewater treatment works (WWTW) consists of an activated sludge process and comprises of an inlet works, two carousel ditch activated sludge reactors, six circular settling tanks, a chlorine disinfection facility (gas), maturation ponds, a sludge dewatering facility and a dewatered sludge silo. The existing works also includes effluent re-use infrastructure comprising a filter building and a final effluent pump station. The WWTW is designed to treat an average dry weather flow (ADWF) of 48Mℓ/day. The effluent is disinfected with chlorine prior to discharge into the sensitive Eerste River. A portion of treated effluent is also recycled for both off-site and on-site use. The waste activated sludge is dewatered, stored in silos and finally disposed of off-site.

Due to rapid urbanisation and a sustained population growth in the False Bay region, a shortfall in treatment capacity is experienced at the Macassar WWTW. The Macassar WWTW experiences a number of operational problems. Both of these factors have led to the Macassar WWTW not being able to treat wastewater adequately, this has resulted in the poor effluent quality discharged into the Eerste River, which meets the Macassar beach (approximately 1.5km from the discharge point in the Eerste River). The mechanical and electrical infrastructure throughout the works is generally poor and dilapidated, with a significant portion having reached their life expectancy. The aeration capacity at the works is a limitation and the de-rated treatment capacity is 21.6Mℓ/day (ADWF). These issues in conjunction have made it difficult to meet the required effluent standards set out in the Water Use License (WULA) issued by the Department of Water and Sanitation (DWS).

The Macassar WWTW and Gordon's Bay WWTW catchment area has seen an unprecedented amount of development over the last 10 years and has been identified for future developments within 2015 City of Cape Town Sewer Master Plan. These developments will increase the wastewater flows received at the Macassar WWTW which is currently at capacity. There is subsequently a need to upgrade the Macassar WWTW to cater for this future capacity whilst addressing the current operational problems experienced at the Works.

The objective of the Employer (City of Cape Town) is to upgrade and expand the existing Macassar WWTW to provide adequate treatment capacity for a 20-year design horizon and will cater for flows up until the end of calendar year 2048. The upgrade and capacity extension of the Macassar WWTW will seek to increase the capacity of the existing Macassar WWTW to 80 Mℓ/day (ADWF).

The Works described in this Contract Document covers the Mechanical and Electrical Installation for the upgrade and extension of the Macassar WWTW.

3.1.2 OVERVIEW OF THE WORKS

This Contract Document comprises the Mechanical and Electrical Installation for the Upgrade and Extension of the Macassar WWTW. The upgrade and extension will remove capacity limitations on the existing process, reduce energy demand, optimise operation and maintenance and prevent further pollution of the Eerste River. The Works comprises of a new inlet works with an emergency tank for excess flows (modifications to the existing reactor) and a primary sludge screening facility, primary settling tanks, new reactor modules (which caters for biological nutrient removal and fine bubble diffused aeration), secondary settling tanks, UV and chlorine disinfection, refurbishment to maturation ponds, gravity thickeners, anaerobic digesters, gas holding tanks, CHP building, dewatering building, sludge storage silos, blower building, treated storage effluent pump station with filter room, buildings (process operation, workshop and storeroom, guard house, weigh bridge, electrical), associated pump

stations, as well as associated pipework and general civil engineering services (roads, stormwater, reticulation networks, fencing, etc.).

The Works will be phased into two (2) phases, namely Phase 1 and 2. This will allow for the new mechanical and electrical equipment to be installed first whilst the existing equipment at the Works remains operational. The flow will then be diverted through the new installations whilst the existing equipment is decommissioned, wherever applicable.

Should the total constructions costs exceed the Employers available budget, the Employer reserves the right to delay or omit the works, or parts thereof.

3.1.3 EXTENT OF THE WORKS

The Works to be carried out by the contractor under this Contract comprises mainly of the following:

- Design
- Manufacture
- Supply
- Delivery
- Installation and Construction
- Testing
- Commissioning and Trial Operation Period
- Training the Employer's staff in Operation and Maintenance
- Upholding during the Defects Notification Period.

The Works shall be designed to function safely and effectively in conjunction with the infrastructure provided by others for this project. Where components of the Works are incorporated into structures provided by others, these components shall be designed accordingly.

The Scope of this Contract will be as follows:

The Mechanical works comprises the installation of the following:

a) Inlet Works:

- Two Archimedes screw pump stations with greasing pumps
- Isolation wall mounted sluice gates (Actuated)
- Ventilation systems for each screw pump station room
- Four (4) mechanical front rake screens and four (4) perforated belt screens
- Four (4) hand-raked bar screens
- Four (4) washer compactors, water launders and skip dollies to house skips containing the removed screenings
- Channel mounted sluice gates with and without actuators
- Three (3) grit classifiers
- Provision of mechanical equipment for six (6) vortex degritters including all associated piping, equipment, valves and a skip dolly to house skips containing the removed grit.
- Odour Control

b) Primary Settling Tanks (PSTs):

- Provision of rotating bridges and sludge valves of four (4) PSTs

- Odour control

c) Six-way PST Flow Splitter:

- Actuated sluice gates

d) Three-way Reactor Distribution Flume Channels:

- Actuated sluice gates

e) Biological Reactors:

- Anaerobic and anoxic mixers
- Titling weirs
- Internal recycle pump stations and valves
- Chemical phosphorus removal dosing equipment

f) Emergency Tank:

- Weirs
- Mixers

g) Secondary Settling Tanks (SSTs):

- Provision of rotating bridges and sludge valves of twelve (12) SSTs

h) Four-way SST Distribution Flume Channels:

- Actuated sluice gates

i) Six-way SST Flow Splitters:

- Actuated sluice gates

j) Effluent Conveyance Channels:

- Sluice gates with and without actuators

k) Disinfection:

- Three (3) step screens
- Six (6) banks of UV units with automatic wipers
- Sluice gates with and without actuators
- Two (2) washer compactors and a skip dolly to house skips containing the removed screenings

l) Primary Sludge Screening Facility:

- Primary sludge pumps
- Two (2) strain presses
- Sluice gates with and without actuators
- Flow measurement device
- Two (2) hydrocyclones, including all associated piping, equipment, valves, etc.
- Odour control

m) Main Sludge Transfer Pump Station:

- Gravity thickener feed pumps
- Digester feed pumps
- WAS pumps
- Pumping associated equipment
- Odour control

n) Gravity Thickeners:

- Bridge motors and rotating equipment for two (2) gravity thickeners
- Odour control

o) Anaerobic Digesters:

- Digester mixing pumps for two (2) anaerobic digesters
- Sludge recirculation pumps for two (2) anaerobic digesters

p) Gas Holding Tanks

- Flaring and gas cleaning equipment

q) Waste Activated Sludge (WAS) Tanks:

- Sludge recirculation pumps

r) Primary Sludge (PS) Holding Tanks

- Sludge recirculation pumps

s) Scum Pump Station

- Scum pumps and associated equipment

t) Dewatering Building:

- WAS sludge feed pumps
- PS sludge feed pumps
- Ten (10) linear screens
- Fourteen (14) belt presses
- Make-up and dosing equipment
- Associated equipment required for pumping and treatment of sludge
- Odour control

u) Sludge Cake Silos:

- Live bottom screws
- Screw conveyors
- Sludge cake pumps

v) Return Activated Sludge (RAS) Pump Station:

- Pumps
- Actuated sluice gates

w) Blower Building:

- Fine bubble diffused aeration (FDBA) blowers
- Compressors
- Associated equipment required for aeration

x) Boiler House Facility:

- Heat exchangers
- Dual fuel boilers
- Hot water recirculation pumps
- Water softening equipment

y) Chlorination Building:

- Gas cylinders
- Water pumps
- Associated chlorination equipment

z) Service Water (Washwater) Pump Station

- Pumps and associated equipment
- Valves

aa) Treated Sewage Effluent (TSE) Infrastructure:

- Pumps and associated equipment
- Automatic self-cleaning filters

bb) Combined Heat and Power (CHP)

- Biogas Engines
- Gas Scrubbing Equipment (H_2S removal, Particulate filtration, moisture removal, siloxane removal etc.)
- Heat Recovery Unit
- Heat Exchanger Units

cc) General:

- Provision of lifting equipment
- Provision of spares as specified in the Contract
- Maintenance of Works

The Electrical works comprises of the following:

a) Liaison with the Employer's MV department to coordinate the shutdown, decommissioning of equipment, removal and transportation of the existing MV network infrastructure and to accommodate and coordinate the electrical works described in this specification.

b) Liaison with the supply authority (Eskom) to coordinate the electrical works described in this specification.

c) Liaison with all parties required to apply and obtain wayleaves and permits.

d) Modification and extension of existing 11 kV cable ring main cables

e) Decommissioning and removal of the existing electrical equipment (including cable supports) above ground

f) 2 off 11.5/11.5kV 7500kVA isolation transformers

g) 12 off 11.5kV/420V distribution transformers

h) 1 off 11.5kV/420V 315kVA Auxiliary transformer

i) New Macassar WWTW Main Intake 11kV Switchboard and metering

j) 2 off 11kV collector switchboards for centralised diesel generators and biogas (CHP) facilities

k) 9 off 400V/11.5kV step-up transformers

l) 6 off 4-way secondary switchgear units

m) 2 off NECRTs

n) MV Cables, including trenching and cable supports where required

o) Centralized generator plant, with bulk fuel tank system and 400V/11.5kV step-up transformers

p) Earthing and bonding

q) Lightning Protection

r) Protection and power quality logging and studies

s) 18 Motor Control Centres

t) Power Factor Correction and Harmonic Filtering (LV)

u) Protection and power quality logging and studies

v) Diesel generators and outdoor diesel fuel tanks

w) LV cables

x) Cable supports

y) Area lighting

z) Factory testing, site testing and commissioning of the electrical installation

aa) Certificates(s) of compliance

bb) As-built drawings

cc) Operation and maintenance manuals

dd) Training

ee) Spares

The Control and Instrumentation works comprises of the following:

a) Programmable Logic Controller (PLC), Human Machine Interface (HMI), and Remote Input/Output (RIO) based control system for the:

- Inlet works.
- Bioreactor
- Primary settling
- Secondary settling
- Blowers
- Dewatering, including primary sludge and waste activated sludge handling.
- Ultraviolet disinfection
- Service water

- TSE

b) Ethernet device layer networks for each main PLC and process area

c) A new site-wide fibre optic backbone for supervisory and control layer dual redundant ring networks, including splicing, testing, and trenching where required.

d) Sub-ring control layer network for the dewatering area

e) An on-site LoRaWAN network of sensors, gateways, and servers to collect data from remote plant areas.

f) Master SCADA system for the complete scheme at the process operation building control room and client operator station at the dewatering area.

g) Historian and reporting

h) Engineering PC and software for system configuration, maintenance, and updates of PLC, SCADA, and networks

i) Discrete and analogue field instrumentation, flow meters and analysing stations, including installation material, and mounting brackets.

j) Instrumentation, IO-Link and data cabling, cable racking and supports.

k) Detailed design of the complete process control system network and all related components

l) Factory acceptance testing of PLC panels, local control panels, instrument junction boxes, transmitter boxes, and instrument terminal boxes.

m) Detailed functional design specification

n) Programming of the PLC, remote IO, networks, SCADA, and HMIs for a complete and functional system

o) Configuration and calibration of field instruments

p) Configuration and integration of the system level SCADA, historian, LoRaWAN software servers and reporting

q) Site acceptance testing and commissioning.

r) Critical spares

s) As-built drawings and documentation

t) Operation and maintenance manuals

u) Training of the client's staff on the operation and maintenance of the new electronic equipment and software to keep the plant running optimally.

v) Certificates of completion

w) Any other items of hardware, software documentation or other required to provide a fully functional process control and monitoring system meeting the functional requirement as described further on in the specification and control system drawings.

3.1.4 LOCATION OF THE WORKS

The Macassar WWTW is located on ERF 1205, between Khayelitsha and Strand, along the False Bay coastline. The site is bound to the South by the sea and the Macassar beach complex lies to the Southwest. On the East, the site is bound by the Eerste River, with industries beyond the river. There is no development to the West of the site, and it is an open vegetated dune landscape. The nearest residential development is the Macassar township, a distance of some 0.6 km from the works and over the years has encroached towards the WWTW but not crossing the Macassar Road.

The site is approximately 62.1 hectares in extent. A site locality plan which also shows the extent of the Macassar WWTW has been included in Volume 1

3.1.5 TEMPORARY WORKS

The Contractor shall be responsible for designing and providing any temporary works required, which shall be approved by a professional engineer or engineering technologist.

Such works and the positioning thereof are to be approved by the Engineer before erection and operation on site.

Such temporary works shall be removed upon completion of the Works and the site of such temporary works re-instated to a pristine condition acceptable to the environmental requirements and to the Engineer.

3.1.6 DESCRIPTION OF SITE AND CONDITIONS

The site is an existing works, which is to remain operational at all times unless when planned outages and diversions are to take place and temporary measures have been put in place.

The following site conditions shall be taken into consideration:

- Altitude above sea level 6-8m mean
- Operating Voltage 400V - 3 Phase
- Electrical Supply Frequency 50 Hz
- Maximum Temperature 40ºC
- Minimum Temperature 5 ºC
- Maximum Relative Humidity 95%
- Corrosion Conditions Very Severe
- Lightning Moderate
- Rainfall Winter
- Flooding Means to prevent flooding is required

3.1.7 SITE ACCESS

The location of the Macassar WWTW is described under Section 3.1.4.

The operation of construction vehicles on existing roads or streets shall be limited to traffic with an axle load not exceeding that allowed by the Road Traffic Ordinance of the authority concerned, or any amendment thereof. The access road to the site shall be through Tie Road via Macassar Road.

The Contractor must note that no additional payment will be made for the construction of temporary access roads to the construction sites, borrow-areas or to the spoil sites.

The Contractor shall clear any spillage caused by his activities on or near any roads, by whatever means necessary, within 24 hours after such spillage has occurred. No additional payment will be made for the clearance of spillage and all related costs will be deemed to be covered under the relevant items.

3.1.8 SCHEDULE OF CIVIL-MECHANICAL INTERFACES (BATTERY LIMITS)

The table below summarises the interfaces between the mechanical and civil contractors scope of supply. Although every effort has been made to identify all the mechanical and civil contractor interfaces this list cannot be treated as comprehensive. If there is any doubt the Employer's Agent shall have the final say.

The duties and responsibilities of each party is listed for each battery limit type. The table is to be used as a guide for both parties for tendering purposes and the details of each are to be finalised during construction and in conjunction with the drawings.

For the purposes of this document, four types of battery limits are defined:

Type 01 Civil contractor supplies and installs puddle pipes and or equipment penetrating a concrete structure, ground, wall, etc. and casts in place. Civil contractor to provide box outs.
After the puddle pipe is installed, it is the contractor's responsibility who is continuing with the installation from or to the puddle pipe, to install the gaskets, bolts, couplings and any fittings necessary to make the connection.
The Civil contractor shall assume ±40mm tolerance for alignment and distance unless specified otherwise by the Mechanical contractor in advance. If no tolerance is specified, the Mechanical contractor shall accommodate the tolerance allowed by the Civil contractor. If deemed

necessary, the Mechanical contractor may check the installation prior to casting by the Civil contractor to ensure suitability and shall collaborate with the Civil contractor.
It shall be the responsibility of the Mechanical contractor to specify a termination other than specified on the drawings, at no additional cost to the Civil contractor, if required by the Mechanical contractor.

Type 02 Mechanical contractor supplies and installs the puddle pipe or equipment penetrating the concrete structure, ground, wall, etc. and is responsible for casting / grouting. Civil contractor to provide box out.
After the puddle pipe is installed ,it is the contractor's responsibility who is continuing with the installation from or to the puddle pipe, to install the gaskets, bolts, couplings and any fittings necessary to make the connection.
It shall be the responsibility of the Mechanical contractor to specify a termination other than indicated on the drawings at no additional cost to the Civil contractor, if required.

Type 03 Mechanical contractor supplies and installs the puddle pipe or equipment penetrating the concrete structure, ground, wall, etc. and is it cast / grouted by Civil contractor. Civil contractor to provide box out.
After the puddle pipe is installed ,it is the contractor's responsibility who is continuing with the installation from or to the puddle pipe, to install the gaskets, bolts, couplings and any fittings necessary to make the connection.
It shall be the responsibility of the Mechanical contractor to specify a termination other than indicated on the drawings at no additional cost to the Civil contractor, if required.

Type 04 This battery limit refers to all sluice gates and wall mounted gates.
The Mechanical and Electrical contractor shall provide details of recesses and openings and check dimensions prior to installation.
The Civil contractor shall form recesses / openings as required within the structures. The Civil contractor shall assume ±40mm tolerance for alignment and distance unless specified otherwise by the Mechanical and Electrical contractor in advance.
The Mechanical and Electrical contractor shall install, secure gates and grout in place.

Battery Limit Number - Type	**Process Area**	**Description**
BL01-04	For the Entire Works	All Channel and Wall mounted Sluice Gates for the entire plant.
BL02-02	Inlet Works	Archimedean Screw Pumpstation Lower Bearing
BL03-02	For the Entire Works	Ventilation Fans and Louvres
BL04-01	For the Entire Works	Service Water Supply
BL05-02	For the Entire Works	All weirs
BL06-02	Inlet Works	Vortex Degritters Mixer/Paddle
BL07-02	Inlet Works	Vortex Degritter Sparge Manifolds
BL08-02	Inlet Works	Vortex Degritter Air Supply
BL09-01	Inlet Works	Vortex Degritter Grit Outlet
BL10-03	For the Entire Works	Skip Dolly site wide
BL11-02	For the Entire Works	Drainage to Inlet Works
BL12-02	For the Entire Works	Mixers Installed for Entire works
BL13-01	PST	Sludge Inlet Pipework
BL14-01	PST	Sludge Withdrawal upstream De-sludge Valve.
BL15-01	PST	Sludge Withdrawal Downstream De-sludge Valve.
BL16-02	Blower building	Discharge and Vent pipework
BL17-02	Bioreactor	Recycle Pumps
BL18-02	WAS Flowmeter Chamber	Upstream Flow meter
BL19-02	WAS Flowmeter Chamber	Downstream Flow meter
BL20-01	SST	Sludge Inlet Pipework
BL21-01	SST	Scum withdrawal puddle pipe
BL22-01	SST	Sludge Withdrawal upstream De-sludge Valve.
BL23-01	SST	Sludge Withdrawal Downstream De-sludge Valve.
BL24-02	Screens/UV units	UV Banks and Screens
BL25-01	For Entire Works	Potable Water Supply
BL26-01	For Entire Works	Suction Pipework For All pumps site wide
BL27-01	For Entire Works	Discharge Pipework For All pumps site wide
BL28-02	Chlorine building	Scrubber inlet pipe
BL29-01	Gravity Thickener	Feed pipe
BL30-01	Gravity Thickener	Upstream of Isolation valve of Gravity Thickener
BL31-01	Gravity Thickener	Downstream of Isolation valve of Gravity Thickener
BL32-01	Holding Tanks	Holding Tanks/Digestors Nozzles
BL33-01	Holding Tanks	Upstream of Holding tanks Flow Meter/Valves

BL34-01	Holding Tanks	Upstream of Holding tanks Flow Meter/Valves
BL35-01	Holding Tanks	Holding Tanks/Digestors Relief valves
BL36-01	Digestors	Upstream isolation Valve upstream of digestors
BL37-01	Digestors	Upstream isolation Valve upstream of digestors
BL38-01	Digestors	Pressure Instrumentation of digestors.
BL39-01	Digestors	Temperature Instrumentation of digestors.
BL40-01	Digestors/Heat Exchangers	Downstream of Heat Exchangers
BL41-02	Dewatering building	Odour control pipework
BL42-01	Dewatering building	Silos
BL43-01	Gas Holding Tanks	Upstream Gas Holding tanks
BL44-01	Gas Holding Tanks	Downstream Gas Holding tanks

3.1.9 WORK TO BE CARRIED OUT BY OTHERS (UNDER SEPARATE CONTRACTS)

The following works will be carried out under separate contracts by others:

Upgrade and Extension of the Macassar Wastewater Treatment Works: Civil Works.

3.1.10 PROCESS CONTROL: ASSISTANCE, MAINTENANCE AND TRAINING PERIOD

CONTENTS

3.1.10.1 PROCESS CONTROL: ASSISTANCE, MAINTENANCE AND TRAINING (FULL TIME)
3.1.10.2 MAINTENANCE INSPECTIONS AFTER DEFECTS NOTIFICATION PERIOD (PART TIME)
3.1.10.3 PERFORMANCE AND PENALTIES

3.1.10.1 PROCESS CONTROL: ASSISTANCE, MAINTENANCE AND TRAINING (FULL TIME)

3.1.10.1.1 Assistance, Maintenance and Training

The twelve (12) months “Process Control Training, Maintenance and Assistance” period shall commence on completion of the 90 days trial and operation period for the construct works and shall end one year thereafter, or on the expiration of the Defects Notification period, whichever occurs last. The Contractor shall make use of the first month of this period to familiarise himself with the operation of the plant prior to offering any official training to the Works Personnel. Although the Works Personnel shall receive some form of “training” during this period (first month after the 90 days trial and operation period), this however will not be regarded as official training. The Official Training shall commence one month after completion of the 90 day trial and operation period and shall end on the expiration of the Defects Notification period.

The Contractor’s staff shall be based full time on site during this period during the hours of 07:30 and 16:00 (five days a week). The Contractor shall have a call-out system to respond to events that happen outside of working hours.

3.1.10.1.2 Contractor and Contractor’s Personel

The Contractor’s staff for this scope shall as a minimum requirement include for the following:

- The Contractor shall have 10 years verifiable experience operating and maintaining similar size WWTW (35 Ml/d or more with Activated Sludge Treatment Process).
- A Class V Process Controller (DWS classification) with at least 10 years verifiable operation, maintenance and management experience for a WWTW of 35 Ml/d or more (with Activated Sludge Treatment Process).
- A Class V Process Controller (DWS classification) with at least 10 years verifiable operation, maintenance and management experience for a WWTW of 35 Ml/d or more (with Activated Sludge Treatment Process).
- The repairs and maintenance on the site shall be supervised by a Millwright and Electrician with 10 years experience or a fitter with 10 years experience.
-

3.1.10.1.3 Process Assistance of the Works (Full Time)

Process assistance of the Works shall mean all units, components, equipment and materials, and their relations to each other, employed to enable reliable and effective wastewater treatment for the process units documented below.

The Contractor shall provide process assistance to the operators and process controllers employed on the Works by the Municipality, specifically the day staff employed during the hours of 07:30 and 16:00 (five days a week). The Municipality shall occasionally rotate the day and night shift staff, to ensure suitable training of all the required personnel.
This service shall be provided in accordance with the prescriptions in this specification, the relevant operation and maintenance manuals, manuals supplied by the equipment suppliers as well as applicable approved industry standards. Operation duties shall generally refer to all tasks and actions required to operate the following process units (in its entirety):

- Inlet Works: Screening and degritting (includes screw pump stations)
- Primary settling tanks
- Biological reactor including sludge wasting, recycle pumps, mixers and fine bubble diffused aeration including blowers.
- Secondary setting tanks
- UV disinfection with screening upstream
- Chlorination
- RAS/WAS pump station
- Various pump stations including the service water and TSE pump station
- Primary sludge screening
- Anaerobic digestion and associated equipment
- Gas holding tanks
- CHP facility
- Sludge holding tanks
- Dewatering Building
- Silos
- MCC's
- SCADA

Other duties to be performed and executed by the Contractor shall include, but shall not be limited to the items listed below:

a) Maintain safety conditions on site

b) Log and report spills, pollution events, power failures, equipment fault (mechanical, electrical or electronic) extraordinary process phenomena, etc. Check auto-reset of power to mechanical equipment

c) Calibrate and set flow measuring to ensure specified hydraulic loading rates on downstream process units

d) Develop a feel for effective treatment by means of visual indicators of good/bad plant performance:

Colour, odour, foam, algae growth, aeration patterns, effluent clarity and quality, bubbles, floating material, solids accumulation, flow patterns, turbulence, etc.

e) Record operating hours and kW-hours of all mechanical equipment

f) Check operation of all valves and sluice gates

g) Ensure that all mechanical, electrical and electronic equipment is operated and performing in accordance with the specifications.

The Contractor shall prepare a Works Journal which he shall use to record the process operations and reporting of the plant. The purpose of the journal is to record the works' performance and provide a valuable reporting tool to demonstrate the performance of the plant and problems experienced.

3.1.10.1.4 Maintenance of the Works (Full Time)

Maintenance of the Works shall mean all units, components, equipment and materials, and their relations to each other, employed to enable reliable and effective wastewater treatment for the process units documented below.

The Contractor shall conduct routine preventative and repair maintenance inspections with the Works Personnel, and when required, carry out the necessary maintenance services when and as required. The Contractor will also be required to carry out breakdown maintenance. During equipment malfunction, or breakdown, the Contractor will use the necessary means to diagnose the problem and provide for the necessary corrective maintenance to repair the equipment. The contractor shall provide all the necessary equipment and tools required for any maintenance services. This service shall be provided in accordance with the prescriptions in this specification and the relevant operation and maintenance manuals, as well as manuals supplied by the equipment suppliers. Maintenance duties shall apply to the following process units (in its entirety):

- Inlet Works: Screening and degritting (includes screw pump stations)
- Primary settling tanks
- Biological reactor including sludge wasting, recycle pumps, mixers and fine bubble diffused aeration including blowers.
- Secondary setting tanks
- UV disinfection with screening upstream
- Chlorination
- RAS/WAS pump station
- Various pump stations including the service water and TSE pump station
- Primary sludge screening
- Anaerobic digestion and associated equipment
- Gas holding tanks
- CHP facility
- Sludge holding tanks
- Dewatering Building
- Silos
- MCC's

- SCADA

Other duties to be performed and executed by the Contractor shall include, but shall not be limited to the items listed below:

a) Log all routine preventative and repair maintenance inspections, and routine maintenance services
b) Log all maintenance calls for faulty equipment, detailing the diagnosis and corrective maintenance service requirements
c) Calibrate and set flow measuring equipment to ensure accurate flow data.

All damaged or defective equipment must be reported to the Wastewater Treatment Works Supervisor immediately and must be repaired or replaced as soon as possible.

The Contractor shall prepare a Works Journal which he shall use to record all routine maintenance inspections, routine maintenance services, maintenance call-outs for equipment malfunction or failure, and corrective maintenance services. The purpose of the journal is to provide a valuable reporting tool to demonstrate the performance of the plant and identify problem areas.

As part of the Maintenance Contract, the following items will be for the Employer's cost:

- Consumables required for any maintenance works, which shall be provided by the Employer

- Spares and replacements shall be provided by the Employer.

The aforementioned excludes defect materials of failed equipment covered by the Contract as part of the defects liability period.

If the Employer should require the Contractor to supply and deliver any consumables, and or spares, then the Contractor will be formally instructed by the Employer or Engineer. If spares are provided by the Contractor, then the Contractor will be reimbursed by the Employer on a cost basis plus the Contractor's mark-up as quoted in the Bill of Quantities.

3.1.10.1.5 Process and Maintenance Training of Works

The Official Training of works personnel shall commence one month after completion of the 90 days trial and operation period and shall end on the expiration of the Defects Notification period. The Contractor shall make use of the first month of the "Process assistance and Maintenance" period to familiarise himself with the operation of the plant prior to offering any official training to the Works Personnel. Although the Works Personnel shall receive some form of "training" during this period, this however will not be regarded as official training.

The Contractor shall be responsible for providing relevant training to at least twelve (12) operating personnel (minimum) and four (4) maintenance personnel (minimum) provided by the Employer or as the Employer requires. The Works personnel shall be a combination of the Employer's day staff and night staff. The Contractor shall develop and facilitate all training sessions at specified intervals to revive and supplement the initial training. A suitably qualified and experienced trainer shall present all training sessions.

3.1.10.1.5.1 Basic Method Statement

The Contractor shall be responsible for conducting a complete investigation of the groups that have to be trained in order to compile a proper training plan. The investigation shall cover at least the following aspects:

a) Assess likelihood of conformance to task-specific requirements (*status quo*) of capabilities

b) Identify minimum pre-qualification criteria in terms of existing knowledge and skill levels in relation to reaching target requirements

c) Evaluate personnel in terms of pre-qualification criteria and tasks to be performed (skills profile)

d) Identify training needs

e) Develop appropriate and accredited training courses and material in terms of task-specific activities and identified training needs and compile the training syllabus per installation.

The Contractor shall identify a suitably qualified trainer to assist in the above investigation and finalise the compilation of a training plan and syllabus. The Contractor shall submit a complete training plan and syllabus for approval by the Employer and Engineer. Once the training plan and syllabus have been approved, the Contractor shall liaise with the Engineer to establish dates and appropriate venues where the Trainees shall be able to demonstrate effectiveness of training activities.

Further regular training sessions shall be scheduled according to the effectiveness of initial maintenance and operating activities.

The Engineer will examine the trainees officially with each demonstration session and shall take record of all activities and of trainees' acquired skills at the completion of each session, according to the Training plan and syllabus.

The number of demonstration sessions shall depend on the competency level attained by the trainees and may be linked to training plan and schedule prepared by the Contractor.

The Contractor shall arrange the issuing of certificates of trainees' acquired skills on the satisfactory completion of the training programme.

3.1.10.1.5.2 Training of Operations Personnel

The Contractor's training shall include training of the Employer's operators and process controllers on a continuous basis to acquaint them with operating of installations (especially mechanical, electrical and electronic systems). The training sessions shall comprise lectures and on-site (hands-on) demonstrations. The Contractor shall train at least twelve (12) minimum of the Employer's operations personnel.

The content of training courses for operators shall include the essential features of operating the installation as well as the relevant Operation and Maintenance Manuals.

The following aspects, but not limited to, are expected to be included in the Contractor's Training Syllabus:

a) Health and environmental risks when handling and disposing of wastewater sludge

b) The dangers and consequences of not following personal hygienic practice and wearing personal protective equipment

c) Operating procedures in terms of the optimal functioning and safe operation, and daily checks at the following process units:

- Inlet Works: Screening and degritting (includes screw pump stations)
- Primary settling tanks
- Biological reactor including sludge wasting, recycle pumps, mixers and fine bubble diffused aeration including blowers.
- Secondary setting tanks
- UV disinfection with screening upstream
- Chlorination
- RAS/WAS pump station
- Various pump stations including the service water and TSE pump station
- Primary sludge screening
- Anaerobic digestion and associated equipment
- Gas holding tanks

- CHP facility
- Sludge holding tanks
- Dewatering Building
- Silos
- MCC's
- SCADA

d) Monitoring, operation and control of the Works using the Scada system

e) Simple methods of measuring flows using various flow measuring devices are explained

f) Operating procedures for the activated sludge processes are explained in terms of the optimal functioning and safe operation of the plant

g) The importance of controlling sludge age, dissolved oxygen and sludge wasting explained in the context of operation within the design parameters

h) Method of recording wastewater sludge volumes and masses

i) Procedures to remove blockages from the equipment are identified and explained in terms of safety and optimal functioning of the plant

j) Procedures to identify breakdowns are explained, including recording and reporting for corrective action.

3.1.10.1.5.3 Training of Maintenance Personnel

The Contractor shall ensure that his own employees are adequately trained for the type of work required by this Contract. In addition, he shall train at least a minimum of four (4) of the Employer's maintenance personnel, with regards to maintenance of an installation. Training shall focus on routine and preventative maintenance aspects. The works personnel shall include technical staff with mechanical and electrical qualifications.

The training of maintenance personnel shall include the following aspects:

a) Awareness of safety, health and personal hygiene in terms of the requirements of the Occupational Health and Safety Act, 1993 (Act 85 of 1993)

b) Functioning of the installation, including all its systems, services, parts of buildings and infrastructure

c) All specific tasks related to routine preventative and repair maintenance at the following process units:

- Inlet Works: Screening and degritting (includes screw pump stations)
- Primary settling tanks
- Biological reactor including sludge wasting, recycle pumps, mixers and fine bubble diffused aeration including blowers.
- Secondary setting tanks
- UV disinfection with screening upstream
- Chlorination
- RAS/WAS pump station

- Various pump stations including the service water and TSE pump station
- Primary sludge screening
- Anaerobic digestion and associated equipment
- Gas holding tanks
- CHP facility
- Sludge holding tanks
- Dewatering Building
- Silos
- MCC's
- SCADA

d) Interpretation and understanding of Operating and Maintenance Manuals with specific reference to requirements in cases of corrective and breakdown maintenance

e) Repair/ reconditioning and installation/construction of equipment and materials forming part of an installation.

3.1.10.2 MAINTENANCE INSPECTIONS AFTER DEFECTS NOTIFICATION PERIOD (PART TIME)

3.1.10.2.1 Maintenance Inspections Period

The six (6) months "Maintenance Inspections" period shall commence 12 months after the trial and operation period and shall continue for six (6) months. The frequency of the maintenance inspections shall be as follows:

- For the first two months: Weekly inspections
- Month 3 and 4: Bi weekly inspections
- Month 5 and 6: Monthly inspections

The Contractor's staff shall be based part time on site during this period, and make themselves available for inspections between the hours of 07:30 and 16:00.

3.1.10.2.2 Maintenance Inspections of the Works (Part Time)

Maintenance of the Works shall mean all units, components, equipment and materials, and their relations to each other, employed to enable reliable and effective wastewater treatment for the process units documented below.

The Contractor shall conduct routine preventative and repair maintenance inspections in conjunction with the Works personnel. The Works personnel shall carry out the necessary maintenance services when and as required, under the supervision of the Contractor. During equipment malfunction, or breakdown, the Contractor will assist the Works Personnel to diagnose the problem, and further assist with the necessary corrective maintenance to repair the equipment. The contractor shall provide all the necessary equipment and tools required for any maintenance services. This service shall be provided in accordance with the prescriptions in this specification and the relevant operation and maintenance manuals. Maintenance inspection shall apply to the following process units (in its entirety):

- Inlet Works: Screening and degritting (includes screw pump stations)
- Primary settling tanks

- Biological reactor including sludge wasting, recycle pumps, mixers and fine bubble diffused aeration including blowers.
- Secondary setting tanks
- UV disinfection with screening upstream
- Chlorination
- RAS/WAS pump station
- Various pump stations including the service water and TSE pump station
- Primary sludge screening
- Anaerobic digestion and associated equipment
- Gas holding tanks
- CHP facility
- Sludge holding tanks
- Dewatering Building
- Silos
- MCC's
- SCADA

Other duties to be performed and executed by the Contractor shall include, but shall not be limited to the items listed below:

a) Log all routine preventative and repair maintenance inspections, and assistance in routine maintenance services

b) Log all maintenance calls for faulty equipment, detailing the diagnosis and corrective maintenance services

The Contractor shall prepare a Works Journal which he shall use to record all routine maintenance inspections, assistance in routine maintenance services, maintenance call-outs for equipment malfunction or failure, and assistance in corrective maintenance services. This journal shall also be used to document and record the skills and capacity of the Works personnel to execute maintenance services. The purpose of the journal is to provide a valuable reporting tool to demonstrate the performance of the plant and identify problem areas, and to further provide feedback on the capacity and capabilities of the Works Personnel in carrying out maintenance services.

As part of the Maintenance Contract, the following items will be for the Employer's cost:

- Consumables required for any maintenance works, which shall be provided by the Employer
- Spares and replacements shall be provided by the Employer.

3.1.10.3 PERFORMANCE AND PENALTIES

3.1.10.3.1 Performance Measurement

The contractor's performance shall be measured based in the following:

- Planned, predictive and reactive maintenance.
- Risk management and emergency repairs.

- Duration of downtime

3.1.10.3.2 Penalties

- Penalties will be instituted for non-compliance with performance indicators.
- Events which could be controllable by the Contractor will result in penalties being imposed.
- Events uncontrollable by the Contractor will be evaluated and penalties will be imposed at discretion of the Municipality.
- The onus remains on the Contractor to substantiate that the events were not controllable and the Contractor to submit details of events within a prescribed time or the argument will not be considered.

3.1.10.3.3 Performance and Penalty Criteria

Performance and Penalty criteria based on downtime are as follows:

Required action	Maximum allowable time	Payment reduction (***applicable to full time and part time period)***
Respond and diagnose	12 hours	R 500 / hour
Fault repair	72 hours	R 750 / hour

C3.2 Engineering

CONTENTS

3.2.1 DESIGN SERVICES AND ACTIVITY MATRIX
3.2.2 EMPLOYER'S DESIGN
3.2.3 DESIGN BRIEF
3.2.4 DRAWINGS
3.2.5 DESIGN PROCEDURES

3.2.1 DESIGN SERVICES AND ACTIVITY MATRIX

The design responsibilities are as follows:

DESIGN PROCESS	RESPONSIBILITY
Concept	Employer responsible
Engineering and layout to tender stage	Employer responsible
Civil design of permanent Works as reflected in the Contract Documents unless otherwise stated	Employer responsible
Temporary works	Contractor responsible for the design of the temporary Works and their compatibility with the permanent Works
As built drawings	Contractor shall supply all details necessary to assist the Engineer in the compilation of the as-built civil drawings and the Contractor shall supply as built drawings for all equipment provided.
Detailed design of the mechanical and electrical work	Contractor responsible for designing the Works in accordance with the Employer's requirements and tender drawings
Control philosophy/functional design	Contractor responsible for designing the Works in accordance with the Employer's requirements

3.2.2 EMPLOYER'S DESIGN

Not applicable to this tender.

3.2.3 DESIGN BRIEF

Where the Contractor is to supply the design of designated parts of the Permanent Works or Temporary Works, he shall supply full working drawings supported by a Professional Engineer's design certificate.

The Contractor's shall be responsible for the design of the mechanical and electrical work. The Contractor's design shall be based on the Employer's requirements and the tender drawings, the existing and future structures and any existing equipment installations and the Contractor shall ensure that the design can be satisfactorily accommodated.

The Contractor shall accommodate actual dimensions and details measured on Site. Any inconsistencies, including any conflict between the Engineer's drawings and the actual dimensions measured on site, shall immediately be drawn to the attention of the Engineer, in writing.

a) OHS Act

The Contractor is responsible for ensuring that the design of the equipment provided, and the installation of this equipment comply with the Occupational health and Safety Act, Act 85 of 1993 and the 2014 Construction

regulations, and the regulations promulgated thereunder. Installations which do not comply shall be corrected by the Contractor at no cost to the Employer.

b) General Safety Requirements

Safety of design is an overriding consideration. Installations which do not comply with the OHS Act shall be corrected by the Contractor at no cost to the Employer.

Equipment which is potentially dangerous shall be designed in accordance with a relevant South African or international Standard which deals with the hazard.

Hazards shall be avoided or guarded to the approval of the Engineer. Nip points shall be guarded. Sharp corners shall be rounded off. Items such as operating handles, supports and protrusions shall be kept clear of access ways or shall be marked clearly.

The Contractor shall cover all unsafe gaps and openings left in structures after installation of the equipment.

Each motor driven device shall be provided with an emergency stop station in an appropriate position.

Trip wires shall be provided along the accessible side/s of moving conveyor belts, chains, etc., irrespective of operating speed and in addition to any guards provided. These shall stop the driving motor when pulled.

c) General Requirements

Design shall ensure safety, robust construction, reliability, durability, prevention of avoidable corrosion, neatness, protection of the environment as well as ease of maintenance and operation.

The Contractor's design shall, as applicable, be based on:

- The full range of duties which can be reasonably anticipated
- The maximum pressure or vacuum which can be produced under all conditions including blocked or closed inlet and outlet circuits
- Conservative service and safety factors based on approved standards or laid down in the printed specifications of reputable and approved manufacturers
- Twenty four hour per day operation (unless specified otherwise)
- A minimum life of 100 000 hours before major part replacement
- Prevention of serious damage from normal operational problems such as blockages, blinding, jamming, seizure, malfunction and, as far as practical, mal-operation
- The power and torque transmitted by the driver system under full load and stalled conditions.
- Machines with non-overloading characteristics shall be selected wherever possible; e.g.: motors shall be sized so that they cannot be overloaded by the driven machine.

d) Hazardous Locations

Equipment which is to be installed in areas with hazardous area location zoning for gasses or for dusts in terms of SANS 10108, shall comply with the requirements of that Standard.

e) Fail Safe Operations and Protections

Where damage can occur from normal operational or other foreseeable problems, plant, equipment and systems shall be designed to be fail safe (i.e. shall have built in redundant elements) or shall be fail to safe (i.e. shall return to a safe condition where no further damage can be done in the event of a failure, malfunction, mal-operation, overload and, as far as practical, misuse). All reasonable and economically justifiable protections to prevent or limit damage to plant and equipment, particularly in high risk situations, shall be incorporated.

Protections shall:

- Be directed at the source of the problem, limit forces to safe levels and act quickly enough to prevent damage (electrical thermal type overloads are inadequate)
- Stop, or prevent from starting, all equipment at risk
- Activate an alarm with a labelled indicator on the control panel, HMI or SCADA mimic whenever a protection operates

- Operate reliably after long inactive periods exposed to corrosive and dirty conditions.

Contractors shall highlight equipment limitations which can be exceeded during operation and cannot be guarded against.

f) Moving Parts

The following general requirements apply to machines and to all equipment with moving parts such as headstocks, extension spindles, swivelling davits, heavy duty hinges, pivots and the like:

- Rotating or swivelling shafts, pins and the like, shall be adequately supported, guided and restrained by lubricated or self-lubricating bearings, collars and/or bushes
- Swivelling joints on linkages and the like shall be of the "universal" or fork and rod type with bearings or bushes fitted to the eyes or forks
- Abrasion resistant materials and slow speed operation shall be used for abrasive applications. (Wastewater and all sludge shall be regarded as abrasive.)
- Susceptibility to fatigue failure shall be minimized by proper design and manufacturing procedures. Sharp changes in section and badly contoured welding shall be avoided especially in components subject to fluctuating stress
- The locking of nuts and pins in position shall be done to the approval of the Engineer
- Wearing parts shall be designed for ease of removal and replacement.

g) Arrangement and Mounting

The design shall take the following requirements into consideration:

- Lifting eyes, lugs, hooks, etc., shall be provided on heavy or large items to facilitate handling
- Castings and fabrications shall have machined pads for seating and shall be mounted on either soleplates or baseplates as appropriate
- Where accurate alignment is required, positioning pins and/or jacking screws shall be provided
- The needs of operation and maintenance including neatness, access, working space, safety, cleaning, adjustment, handling, assembly, alignment, disassembly, removal, etc., shall be accommodated.
- With plant and equipment to be mounted on or against concrete or brick structures built by others, provision shall be made for adjustment in the mechanical design. Any special accuracy requirements must be specified on the Contractor's Documents.

h) Prevention of Corrosion

The Contractor shall review all designs in order to achieve acceptable corrosion protection. Any details which might have a negative effect on the corrosion protection and the future application of coatings are to be brought to the Engineer's attention for a ruling prior to commencement of work.

All items shall be designed to minimise corrosion in the environment in which they will be exposed. Particular emphasis shall be placed on accessibility for surface preparation and the application of coatings. The detailed requirements for corrosion protection are dealt with elsewhere in this document.

Mastics, sealants, insertion rubber or suitable gasket material shall be used to seal unavoidable crevices such as bolted connections.

The design shall ensure that all surfaces to be coated shall be accessible for fettling, blast cleaning, painting and for maintenance of these surfaces. Stainless steel surfaces shall be accessible for pickling and passivation. The use of back-to-back angles, partially open box sections or inaccessible stiffeners shall be avoided. Inaccessible surfaces which cannot be avoided shall be welded closed.

Particular attention shall be paid to the fabrication and inspection requirements for internal weld surfaces in pipework.

All applications associated with wastewater shall be regarded as corrosive and materials of construction shall be selected to suit.

3.2.4 DRAWINGS

The following drawings are applicable to the Contract and are issued with this tender document and will form part of the Contract Documents as Volume 4.

TENDER DRAWING REGISTER	
Drawing Number	Drawing Description
A. GENERAL DRAWINGS	
1001780-0000-DRG-CC-0000	Drawing Index
1001780-0000-DRG-CC-0001	Existing Site Layout
1001780-0000-DRG-CC-0002	New Site Layout (Sheet 1 of 2)
1001780-0000-DRG-CC-0003	New Site Layout (Sheet 2 of 2)
1001780-0000-DRG-CC-0004	Phasing of Works
1001780-0000-DRG-CC-0005	No-Go Zone Areas
1001780-0000-DRG-CC-0006	Existing Services and Survey Layout (Sheet 1 of 2)
1001780-0000-DRG-CC-0007	Existing Services and Survey Layout (Sheet 2 of 2)
1001780-0000-DRG-CC-0009	Site Demolition Plan and Diversion Works
1001780-0000-DRG-CC-0013	Service Water Network Layout
1001780-0000-DRG-CC-0014	Potable Water Network Layout
1001780-0000-DRG-CC-0015	On-Site Sewerage System
1001780-0000-DRG-CC-0016	Hydraulic Profile Diagram - Liquid Stream (Sheet 1 of 3)
1001780-0000-DRG-CC-0017	Hydraulic Profile Diagram - Liquid Stream (Sheet 2 of 3)
1001780-0000-DRG-CC-0018	Hydraulic Profile Diagram - Liquid Stream (Sheet 3 of 3)
1001780-0000-DRG-CC-0019	Hydraulic Profile Diagram - Sludge Stream (Sheet 1 of 2)
1001780-0000-DRG-CC-0020	Hydraulic Profile Diagram - Sludge Stream (Sheet 2 of 2)
1001780-0000-DRG-CC-0022	Sleeve Layout (Sheet 1 of 4)
1001780-0000-DRG-CC-0023	Sleeve Layout (Sheet 2 of 4)
1001780-0000-DRG-CC-0024	Sleeve Layout (Sheet 3 of 4)
1001780-0000-DRG-CC-0025	Sleeve Layout (Sheet 4 of 4)
1001780-0000-DRG-CC-0026	Walkway Paving Layout
1001780-0000-DRG-CC-0027	Sitewide Subsoil Drainage Layout
B. STANDARD DETAILS	
1001780-0000-DRG-CC-0205	Standard Details: Typical Floor Details (Sheet 1 of 3)
1001780-0000-DRG-CC-0206	Standard Details: Typical Floor Details (Sheet 2 of 3)
1001780-0000-DRG-CC-0207	Standard Details: Typical Floor Details (Sheet 3 of 3)
1001780-0000-DRG-CC-0220	Standard Details: Washwater and Treated Effluent Network: Details
1001780-0000-DRG-CC-0221	Standard Details: Potable Water Network: Details
1001780-0000-DRG-CC-0232	Standard Details: Typical Duct Manhole & Draw Pit Details
1001780-0000-DRG-CC-0244	Nameboard
C. CONCRETE STRUCTURES	
1001780-0000-DRG-CC-0300	Inlet Works: 3D Views
1001780-0000-DRG-CC-0301	Inlet Works: General Arrangement
1001780-0000-DRG-CC-0302	Inlet Works: Foundation Layout and Details (Sheet 1 of 2)
1001780-0000-DRG-CC-0303	Inlet Works: Foundation Layout and Details (Sheet 2 of 2)
1001780-0000-DRG-CC-0304	Inlet Works: Second Lift Screw Pump Station Floor Plan @ Levels 22.000m & 16.700m
1001780-0000-DRG-CC-0305	Inlet Works: Vortex Degritters Plan @ Level 22.000m
1001780-0000-DRG-CC-0306	Inlet Works: Vortex Degritters Plan @ Level 13.000m

1001780-0000-DRG-CC-0307	Inlet Works: Screen Channels Floor Plan @ Levels 22.000m & 13.900m
1001780-0000-DRG-CC-0308	Inlet Works: First Lift Screw Pump Station Floor Plan @ Levels 20.000m & 14.7000m
1001780-0000-DRG-CC-0309	Inlet Works: Second Lift Screw Pump Station Sections & Details (Sheet 1 of 3)
1001780-0000-DRG-CC-0310	Inlet Works: Second Lift Screw Pump Station Sections & Details (Sheet 2 of 3)
1001780-0000-DRG-CC-0311	Inlet Works: Second Lift Screw Pump Station Sections & Details (Sheet 3 of 3)
1001780-0000-DRG-CC-0312	Inlet Works: Vortex Degritters Sections & Details (Sheet 1 of 2)
1001780-0000-DRG-CC-0313	Inlet Works: Vortex Degritters Sections & Details (Sheet 2 of 2)
1001780-0000-DRG-CC-0314	Inlet Works: Screen Channels Sections & Details (Sheet 1 of 2)
1001780-0000-DRG-CC-0315	Inlet Works: Screen Channels Sections & Details (Sheet 2 of 2)
1001780-0000-DRG-CC-0316	Inlet Works: First Lift Screw Pump Station Sections & Details (Sheet 1 of 3)
1001780-0000-DRG-CC-0317	Inlet Works: First Lift Screw Pump Station Sections & Details (Sheet 2 of 3)
1001780-0000-DRG-CC-0318	Inlet Works: First Lift Screw Pump Station Sections & Details (Sheet 3 of 3)
1001780-0000-DRG-CC-0319	Inlet Works: Mono-Skip Rails Plan, Sections & Details
1001780-0000-DRG-CC-0320	Inlet Works: Elevations
1001780-0000-DRG-CC-0331	Primary Settling Tanks 6 Way Splitter: 3D Views
1001780-0000-DRG-CC-0332	Primary Settling Tanks 6 Way Splitter: Ground Floor Plan
1001780-0000-DRG-CC-0333	Primary Settling Tanks 6 Way Splitter: Foundation Layouts
1001780-0000-DRG-CC-0334	Primary Settling Tanks 6 Way Splitter: General Arrangements
1001780-0000-DRG-CC-0335	Primary Settling Tanks 6 Way Splitter: Drainage and Joint Layouts
1001780-0000-DRG-CC-0336	Primary Settling Tanks 6 Way Splitter: Section and Details (Sheet 1 of 2)
1001780-0000-DRG-CC-0337	Primary Settling Tanks 6 Way Splitter: Section and Details (Sheet 2 of 2)
1001780-0000-DRG-CC-0338	Primary Settling Tanks No.1 - No.4: Typical 3D Views
1001780-0000-DRG-CC-0339	Primary Settling Tanks No.1 - No.4: Ground Floor Plan
1001780-0000-DRG-CC-0340	Primary Settling Tanks No.1 - No.4: Typical Drainage and Joint Layout
1001780-0000-DRG-CC-0341	Primary Settling Tanks No.1 - No.4: Typical Sections And Details (Sheet 1 of 3)
1001780-0000-DRG-CC-0342	Primary Settling Tanks No.1 - No.4: Typical Sections And Details (Sheet 2 of 3)
1001780-0000-DRG-CC-0343	Primary Settling Tanks No.1 - No.4: Typical Sections And Details (Sheet 3 of 3)
1001780-0000-DRG-CC-0344	Primary Settling Tanks No.1 - No.4: Stairs Details (Sheet 1 of 2)
1001780-0000-DRG-CC-0345	Primary Settling Tanks No.1 - No.4: Stairs Details (Sheet 1 of 2)
1001780-0000-DRG-CC-0348	Conversion of Existing Biological Reactor to Balancing Tank: 3D Views
1001780-0000-DRG-CC-0349	Conversion of Existing Biological Reactor to Balancing Tank: General Arrangement
1001780-0000-DRG-CC-0350	Conversion of Existing Biological Reactor to Balancing Tank: Foundation Layout
1001780-0000-DRG-CC-0351	Conversion of Existing Biological Reactor to Balancing Tank: Sections & Details (Sheet 1 of 4)
1001780-0000-DRG-CC-0352	Conversion of Existing Biological Reactor to Balancing Tank: Sections & Details (Sheet 2 of 4)
1001780-0000-DRG-CC-0353	Conversion of Existing Biological Reactor to Balancing Tank: Sections & Details (Sheet 3 of 4)
1001780-0000-DRG-CC-0354	Conversion of Existing Biological Reactor to Balancing Tank: Sections & Details (Sheet 4 of 4)
1001780-0000-DRG-CC-0357	Reactor 6-Way Splitter: 3D Views
1001780-0000-DRG-CC-0358	Reactor 6-Way Splitter: General Arrangement
1001780-0000-DRG-CC-0359	Reactor 6-Way Splitter: Foundation Layout
1001780-0000-DRG-CC-0360	Reactor 6-Way Splitter: Sections & Details
1001780-0000-DRG-CC-0361	Reactor 6-Way Splitter: Elevations

1001780-0000-DRG-CC-0363	Proposed Biological Reactor: 3D Views
1001780-0000-DRG-CC-0364	Biological Reactor: Proposed and Future Layout
1001780-0000-DRG-CC-0365	Biological Reactor: General Arrangement
1001780-0000-DRG-CC-0366	Biological Reactor: Foundation Layout
1001780-0000-DRG-CC-0367	Biological Reactor: Joint Layout
1001780-0000-DRG-CC-0368	Biological Reactor: Subsoil Drainage Layout
1001780-0000-DRG-CC-0369	Biological Reactor: Walkway and Platform Layout
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1001780-0000-DRG-CC-0801	Process Pipework: Longsection: (RS03)
1001780-0000-DRG-CC-0802	Process Pipework: Longsection: (RS04)
1001780-0000-DRG-CC-0803	Process Pipework: Longsection: (RS05)
1001780-0000-DRG-CC-0804	Process Pipework: Longsection: (RS06)
1001780-0000-DRG-CC-0805	Process Pipework: Longsection: (RS07)
1001780-0000-DRG-CC-0806	Process Pipework: Longsection: (RS08)
1001780-0000-DRG-CC-0807	Process Pipework: Longsection: (RS09)
1001780-0000-DRG-CC-0808	Process Pipework: Longsection: (RS10)
1001780-0000-DRG-CC-0809	Process Pipework: Longsection: (RS11)
1001780-0000-DRG-CC-0810	Process Pipework: Longsection: (RS12)
1001780-0000-DRG-CC-0811	Process Pipework: Longsection: (RS13)
1001780-0000-DRG-CC-0812	Process Pipework: Longsection: (RS14)
1001780-0000-DRG-CC-0813	Process Pipework: Longsection: (RS15)
1001780-0000-DRG-CC-0814	Process Pipework: Longsection: (RS16)
1001780-0000-DRG-CC-0815	Process Pipework: Longsection: (RS17)
1001780-0000-DRG-CC-0816	Process Pipework: Longsection: (RS18)
1001780-0000-DRG-CC-0817	Process Pipework: Longsection: (ML01)
1001780-0000-DRG-CC-0818	Process Pipework: Longsection: (ML02)
1001780-0000-DRG-CC-0819	Process Pipework: Longsection: (ML03)
1001780-0000-DRG-CC-0820	Process Pipework: Longsection: (ML04)
1001780-0000-DRG-CC-0821	Process Pipework: Longsection: (ML05)
1001780-0000-DRG-CC-0822	Process Pipework: Longsection: (ML06)
1001780-0000-DRG-CC-0823	Process Pipework: Longsection: (ML07)
1001780-0000-DRG-CC-0824	Process Pipework: Longsection: (ML08)
1001780-0000-DRG-CC-0825	Process Pipework: Longsection: (ML09)
1001780-0000-DRG-CC-0826	Process Pipework: Longsection: (ML10)
1001780-0000-DRG-CC-0827	Process Pipework: Longsection: (ML11)
1001780-0000-DRG-CC-0828	Process Pipework: Longsection: (ML12)
1001780-0000-DRG-CC-0829	Process Pipework: Longsection: (ML13)
1001780-0000-DRG-CC-0830	Process Pipework: Longsection: (ML14)

1001780-0000-DRG-CC-0831	Process Pipework: Longsection: (ML15)
1001780-0000-DRG-CC-0832	Process Pipework: Longsection: (ML16)
1001780-0000-DRG-CC-0833	Process Pipework: Longsection: (TE01)
1001780-0000-DRG-CC-0834	Process Pipework: Longsection: (RS01)
1001780-0000-DRG-CC-0835	Process Pipework: Longsection: (TE03)
1001780-0000-DRG-CC-0836	Process Pipework: Longsection: (TE04)
1001780-0000-DRG-CC-0837	Process Pipework: Longsection: (TE05 and TE06)
1001780-0000-DRG-CC-0838	Process Pipework: Longsection: (RS02)
1001780-0000-DRG-CC-0839	Process Pipework: Longsection: (TE07)
1001780-0000-DRG-CC-0840	Process Pipework: Longsection: (TE08 and TE09)
1001780-0000-DRG-CC-0841	Process Pipework: Longsection: (TE02)
1001780-0000-DRG-CC-0842	Process Pipework: Longsection: (TE10)
1001780-0000-DRG-CC-0843	Process Pipework: Longsection: (TE11)
1001780-0000-DRG-CC-0844	Process Pipework: Longsection: (TE12)
1001780-0000-DRG-CC-0845	Process Pipework: Longsection: (TE13)
1001780-0000-DRG-CC-0846	Process Pipework: Longsection: (TE14)
1001780-0000-DRG-CC-0847	Process Pipework: Longsection: (TE15)
1001780-0000-DRG-CC-0848	Process Pipework: Longsection: (TE16)
1001780-0000-DRG-CC-0849	Process Pipework: Longsection: (TE17)
1001780-0000-DRG-CC-0850	Process Pipework: Longsection: (TE18)
1001780-0000-DRG-CC-0851	Process Pipework: Longsection: (TE19)
1001780-0000-DRG-CC-0852	Process Pipework: Longsection: (TE20)
1001780-0000-DRG-CC-0853	Process Pipework: Longsection: (TE21)
1001780-0000-DRG-CC-0854	Process Pipework: Longsection: (TE22)
1001780-0000-DRG-CC-0855	Process Pipework: Longsection: (IB01)
1001780-0000-DRG-CC-0856	Process Pipework: Longsection: (IB02)
1001780-0000-DRG-CC-0857	Process Pipework: Longsection: (IB03)
1001780-0000-DRG-CC-0858	Process Pipework: Longsection: (IB04)
1001780-0000-DRG-CC-0859	Process Pipework: Longsection: (IB05)
1001780-0000-DRG-CC-0860	Process Pipework: Longsection: (IB06)
1001780-0000-DRG-CC-0861	Process Pipework: Longsection: (IB07)
1001780-0000-DRG-CC-0862	Process Pipework: Longsection: (IB08)
1001780-0000-DRG-CC-0863	Process Pipework: Longsection: (IB09)
1001780-0000-DRG-CC-0864	Process Pipework: Longsection: (IB10)
1001780-0000-DRG-CC-0865	Process Pipework: Longsection: (IB11)
1001780-0000-DRG-CC-0866	Process Pipework: Longsection: (IB12)
1001780-0000-DRG-CC-0867	Process Pipework: Longsection: (IB13)
1001780-0000-DRG-CC-0868	Process Pipework: Longsection: (IB14)
1001780-0000-DRG-CC-0869	Process Pipework: Longsection: (IB15)
1001780-0000-DRG-CC-0870	Process Pipework: Longsection: (TE00)
1001780-0000-DRG-CC-0871	Process Pipework: Longsection: (DS01)
1001780-0000-DRG-CC-0872	Process Pipework: Longsection: (DS02)
1001780-0000-DRG-CC-0873	Process Pipework: Longsection: (DS03)
1001780-0000-DRG-CC-0874	Process Pipework: Longsection: (DS04)
1001780-0000-DRG-CC-0875	Process Pipework: Longsection: (DS05)
1001780-0000-DRG-CC-0876	Process Pipework: Longsection: (DS06)
1001780-0000-DRG-CC-0877	Process Pipework: Longsection: (DS07)
1001780-0000-DRG-CC-0878	Process Pipework: Longsection: (DS08)
1001780-0000-DRG-CC-0879	Process Pipework: Longsection: (PS01)
1001780-0000-DRG-CC-0880	Process Pipework: Longsection: (PS02)

1001780-0000-DRG-CC-0881	Process Pipework: Longsection: (PS03)
1001780-0000-DRG-CC-0882	Process Pipework: Longsection: (PS04)
1001780-0000-DRG-CC-0883	Process Pipework: Longsection: (PS05)
1001780-0000-DRG-CC-0884	Process Pipework: Longsection: (PS06)
1001780-0000-DRG-CC-0885	Process Pipework: Longsection: (PS07)
1001780-0000-DRG-CC-0886	Process Pipework: Longsection: (PS08)
1001780-0000-DRG-CC-0887	Process Pipework: Longsection: (SS01)
1001780-0000-DRG-CC-0888	Process Pipework: Longsection: (SS02)
1001780-0000-DRG-CC-0889	Process Pipework: Longsection: (SS03)
1001780-0000-DRG-CC-0890	Process Pipework: Longsection: (SS04)
1001780-0000-DRG-CC-0891	Process Pipework: Longsection: (SS05)
1001780-0000-DRG-CC-0892	Process Pipework: Longsection: (SS06)
1001780-0000-DRG-CC-0893	Process Pipework: Longsection: (SS07)
1001780-0000-DRG-CC-0894	Process Pipework: Longsection: (SS08)
1001780-0000-DRG-CC-0895	Process Pipework: Longsection: (SS09)
1001780-0000-DRG-CC-0896	Process Pipework: Longsection: (SS10)
1001780-0000-DRG-CC-0897	Process Pipework: Longsection: (SS16)
1001780-0000-DRG-CC-0898	Process Pipework: Longsection: (SS17)
1001780-0000-DRG-CC-0899	Process Pipework: Longsection: (SS18)
1001780-0000-DRG-CC-0900	Process Pipework: Longsection: (SS19)
1001780-0000-DRG-CC-0901	Process Pipework: Longsection: (TS01)
1001780-0000-DRG-CC-0902	Process Pipework: Longsection: (TS02)
1001780-0000-DRG-CC-0903	Process Pipework: Longsection: (TS03)
1001780-0000-DRG-CC-0904	Process Pipework: Longsection: (TS04)
1001780-0000-DRG-CC-0905	Process Pipework: Longsection: (TS05)
1001780-0000-DRG-CC-0906	Process Pipework: Longsection: (TS06)
1001780-0000-DRG-CC-0907	Process Pipework: Longsection: (TS07)
1001780-0000-DRG-CC-0908	Process Pipework: Longsection: (TS08)
1001780-0000-DRG-CC-0909	Process Pipework: Longsection: (TS09)
1001780-0000-DRG-CC-0910	Process Pipework: Longsection: (TS10)
1001780-0000-DRG-CC-0911	Process Pipework: Longsection: (WS01)
1001780-0000-DRG-CC-0912	Process Pipework: Longsection: (WS02)
1001780-0000-DRG-CC-0913	Process Pipework: Longsection: (WS03)
1001780-0000-DRG-CC-0914	Process Pipework: Longsection: (WS04)
1001780-0000-DRG-CC-0915	Process Pipework: Longsection: (WS05)
1001780-0000-DRG-CC-0916	Process Pipework: Longsection: (WS06)
1001780-0000-DRG-CC-0917	Process Pipework: Longsection: (WS07)
1001780-0000-DRG-CC-0918	Process Pipework: Longsection: (WS08)
1001780-0000-DRG-CC-0919	Process Pipework: Longsection: (WS09)
1001780-0000-DRG-CC-0920	Process Pipework: Longsection: (WS10)
1001780-0000-DRG-CC-0921	Process Pipework: Longsection: (WS11)
1001780-0000-DRG-CC-0922	Process Pipework: Longsection: (WS12)
1001780-0000-DRG-CC-0923	Process Pipework: Longsection: (WS13)
1001780-0000-DRG-CC-0924	Process Pipework: Longsection: (WS14)
1001780-0000-DRG-CC-0925	Process Pipework: Longsection: (WS15)
1001780-0000-DRG-CC-0926	Process Pipework: Longsection: (WS16)
1001780-0000-DRG-CC-0927	Process Pipework: Longsection: (WS17)
1001780-0000-DRG-CC-0928	Process Pipework: Longsection: (WS18)
1001780-0000-DRG-CC-0929	Process Pipework: Longsection: (WS19)
1001780-0000-DRG-CC-0930	Process Pipework: Longsection: (WS20)

1001780-0000-DRG-CC-0931	Process Pipework: Longsection: (WS21)
1001780-0000-DRG-CC-0932	Process Pipework: Longsection: (WS22)
1001780-0000-DRG-CC-0933	Process Pipework: Longsection: (SC01)
1001780-0000-DRG-CC-0934	Process Pipework: Longsection: (SC02)
1001780-0000-DRG-CC-0935	Process Pipework: Longsection: (SC03)
1001780-0000-DRG-CC-0936	Process Pipework: Longsection: (SC04)
1001780-0000-DRG-CC-0937	Process Pipework: Longsection: (SC05)
1001780-0000-DRG-CC-0938	Process Pipework: Longsection: (SC06)
1001780-0000-DRG-CC-0939	Process Pipework: Longsection: (SC07)
1001780-0000-DRG-CC-0940	Process Pipework: Longsection: (SC08)
1001780-0000-DRG-CC-0941	Process Pipework: Longsection: (SC09)
1001780-0000-DRG-CC-0942	Process Pipework: Longsection: (SC10)
1001780-0000-DRG-CC-0943	Process Pipework: Longsection: (SC11)
1001780-0000-DRG-CC-0944	Process Pipework: Longsection: (SC12)
1001780-0000-DRG-CC-0945	Process Pipework: Longsection: (SC13)
1001780-0000-DRG-CC-0946	Process Pipework: Longsection: (SC14)
1001780-0000-DRG-CC-0947	Process Pipework: Longsection: (SC15)
1001780-0000-DRG-CC-0948	Process Pipework: Longsection: (SC16)
1001780-0000-DRG-CC-0949	Process Pipework: Longsection: (SC17)
1001780-0000-DRG-CC-0950	Process Pipework: Longsection: (SC18)
1001780-0000-DRG-CC-0951	Process Pipework: Longsection: (SC19)
1001780-0000-DRG-CC-0952	Process Pipework: Longsection: (SC20)
1001780-0000-DRG-CC-0953	Process Pipework: Longsection: (SC21)
1001780-0000-DRG-CC-0954	Process Pipework: Longsection: (SC22)
1001780-0000-DRG-CC-0955	Process Pipework: Longsection: (SC23)
1001780-0000-DRG-CC-0956	Process Pipework: Longsection: (SC24)
1001780-0000-DRG-CC-0957	Process Pipework: Longsection: (SC25)
1001780-0000-DRG-CC-0958	Process Pipework: Longsection: (SC26)
1001780-0000-DRG-CC-0959	Process Pipework: Longsection: (SR01)
1001780-0000-DRG-CC-0960	Process Pipework: Longsection: (SR02)
1001780-0000-DRG-CC-0961	Process Pipework: Longsection: (SR03)
1001780-0000-DRG-CC-0962	Process Pipework: Longsection: (SR04)
1001780-0000-DRG-CC-0963	Process Pipework: Longsection: (SR05)
1001780-0000-DRG-CC-0964	Process Pipework: Longsection: (SR06)
1001780-0000-DRG-CC-0965	Process Pipework: Longsection: (SR07)
1001780-0000-DRG-CC-0966	Process Pipework: Longsection: (SR08)
1001780-0000-DRG-CC-0967	Process Pipework: Longsection: (SR09)
J. ARCHITECTURAL DRAWINGS	
1001780-0000-DRG-AA-0001	Process Operations Building: Ground Storey Plan
1001780-0000-DRG-AA-0002	Process Operations Building: First Storey Plan
1001780-0000-DRG-AA-0003	Process Operations Building: Roof Plan
1001780-0000-DRG-AA-0004	Process Operations Building: Elevations
1001780-0000-DRG-AA-0005	Process Operations Building: Sections - 1 Of 2
1001780-0000-DRG-AA-0007	Process Operations Building: Ground Storey - Reflected Ceiling Plan
1001780-0000-DRG-AA-0008	Process Operations Building: First Storey - Reflected Ceiling Plan
1001780-0000-DRG-AA-0009	Process Operations Building: 3d Axonometric Views
1001780-0000-DRG-AA-0101	Workshop And Stores Building: Ground Storey Plan
1001780-0000-DRG-AA-0102	Workshop And Stores Building: First Storey Plan

1001780-0000-DRG-AA-0103	Workshop And Stores Building: Roof Plan
1001780-0000-DRG-AA-0104	Workshop And Stores Building: Elevations
1001780-0000-DRG-AA-0105	Workshop And Stores Building: Sections
1001780-0000-DRG-AA-0106	Workshop And Stores Building: Ground Storey - Reflected Ceiling Plan
1001780-0000-DRG-AA-0107	Workshop And Stores Building: First Storey - Reflected Ceiling Plan
1001780-0000-DRG-AA-0108	Workshop And Stores Building: Axo Views

3.2.5 DESIGN PROCEDURES

3.2.5.1 GENERAL REQUIREMENTS

The Contractor's Documents shall comply with the following general requirements:

- A register of all the Contractor's documents shall be provided with each submission
- Drawings shall be prepared in accordance with the latest issue of SANS 10111. An equivalent international code of engineering drawing practice will also be acceptable
- General Arrangement drawings shall be to A1 size
- Drawings shall be to scale, with both the scale and the drawing being large enough to clearly show all relevant components of the plant and equipment
- In addition to the usual plan and two side elevations, sufficient additional sections shall be included to clearly show the arrangement of all plant and equipment
- Item lists shall be provided on the drawing or on a separate parts list
- Item descriptions shall include the material of construction, quantity and full identification information, including, as applicable, brand name, manufacturer's reference number, model number, size, rating, source, duty, quantity, etc.

3.2.5.2 REQUIRED SUBMISSIONS WITHIN 14 DAYS

The Contractor shall submit the following for acceptance within 14 working days from the Commencement Date:

- Programme for The Works in Gantt chart format
- Health and Safety Plan for approval by the Client’s appointed Health and Safety Responsible Person
- Copies of insurance policies in respect of the Works, Special Risks and Liability Insurance and evidence of payment of current premiums
- Valid Performance Security.

3.2.5.3 REQUIRED SUBMISSIONS IN-LINE WITH PROGRAMME

The Contractor shall submit the following for acceptance within 42 days from the Commencement Date:

- Contractor’s document register
- Model element breakdown
- Process flow and instrumentation diagram, indicating items of equipment with final lab
- Draft Information model (see Information Modelling in Clause 3.2.5.11)
- Dimensioned layout drawings (preferably A0 size but no smaller than A1) of the installation showing the proposed layout and design of all plant and equipment (including lifting equipment) as well as any required building modifications. Sufficient sections and elevations must be shown so that the relative arrangement of all equipment is clear
- Motor and Instrumentation list
- Data sheets giving performance, sizing, physical and general technical data for all components of the installation
- Dimensioned arrangement drawings of all equipment requirements in respect of the building and civil structures
- Civil requirements for the new plinths
- Civil requirements for electrical and generator rooms
- RMU and transformer plinth requirements
- Loadings requirements which the lifting gear (including crawl beams, gantries, etc.) will place on other structures
- Drawings of pipe support details
- Technical data sheets for all coatings proposed
- Electrical single line diagrams
- Control system architecture

- FDS contents list
- Control philosophy
- Contents list for the Operation and Maintenance Manual
- Quality Control Plans for equipment
- Dimensioned drawings of equipment
- HVAC design
- Diesel powered generator sets design and drawings
- CHP design and drawings
- Load flow analysis
- Short circuit analysis
- Power factor analysis
- Harmonic analysis
- ETAP model
- MV Single line drawings
- MV protection drawings and protection philosophy
- MV panel general arrangement drawings
- MV schematics
- MV, LV and C&I Cable schedules
- MV and LV cable route and support system drawings
- MV switching philosophy
- Eskom self-build documents
- Single line diagrams per system
- MCC general arrangement drawings
- Ground Resistivity Survey and report
- Earthing designs, earthing SLD and earthings schematics
- PLC and IO Panel general arrangement drawings
- MCC schematics, door layouts
- Circuit breaker settings
- RMU schematics
- RMU general arrangement drawings
- RMU data sheet
- MV, LV and C&I Cable block diagrams
- Detailed control architecture drawing
- Loop diagrams
- Hook-up drawings and mounting bracket details
- C&I and data cable route drawings and support system drawings
- Junction box design
- Junction box general arrangements
- UPS and PSU load calculations and data sheets
- Control system functional design specification
- Telemetry design documentation
- WiFi propagation study
- Control Room and server room layout

3.2.5.4 REQUIRED SUBMISSIONS BEFORE COMMISSIONING OF THE WORKS

Prior to commencement of the commissioning tests, the Contractor shall submit:

- Routine and type test reports for al electrical equipment and motors
- Pre-commissioning test results
- As-built information model
- Commissioning plan indicating the commissioning activities that will take place, including a proposed programme for these activities.
- Operator training plan
- Draft Operation and Maintenance Manual

3.2.5.5 REQUIRED SUBMISSIONS BEFORE AND AFTER TRIAL OPERATION PERIOD

Prior to commencement of the Trial Operation Period, the Contractor shall submit:

- Comprehensive report containing detailed schedules and documentation to record all commissioning tests undertaken and the results of these, demonstrating that the Works have passed the commissioning tests. The data and reports shall be provided from the reporting system with annotation and comments on events to proof that the plant passed the commissioning tests.

- Training logs and weekly reports detailing the plant performance, problems and equipment failures during the Trial Operation Period (TOP). The TOP reports and data shall be provided from the reporting system with annotation and comments on events to proof that the plant operated defect free and according to the Employer's Requirements.
- An overall report at the end of the TOP

3.2.5.6 BEFORE TAKING-OVER CERTIFICATE

Before the Taking-Over Certificate is issued, the Contractor shall provide three copies of the approved version of the Operation and Maintenance Manual and shall also provide, on electronic data storage, all drawings supplied in terms of the Required Submissions within 42 and 70 days above, corrected where necessary to be "as built". The drawings shall be configured for AutoCAD, or equivalent. The Manual shall comply with the specifications for O&M manuals as detailed in the Specifications.

3.2.5.7 CONTENTS OF CONTROL SYSTEM FUNCTIONAL DESIGN DOCUMENT

The Contractor shall submit a Control System and Data Architecture FDS (Functional Design Specification). The specification shall cover the following content:

Item No	Description of Content
1	**General**
1.1	Contents List
1.2	Introduction
1.3	Drawing List (referring to P&IDs)
1.4	Tag naming convention
2	**Control Philosophy**
2.1	Plant should be broken down into its various functional units (inlet works screening, bioreactor, chlorination etc.). For each functional area the following shall be provided:
2.2	Control Modes Description
2.3	Motor List
2.4	Instrumentation List
2.5	Instrumentation Signals
2.6	Output signal during instrument error
2.7	Valve list and Failsafe positions of valves
2.8	Interlocks
2.9	Safety Interlocks
3	Process Interlocks
3.1	Startup/Shutdown Procedures (including for back-up power supply if applicable)
3.2	Duty Selection and Changeover
3.3	Startup/Shutdown Procedures (including for back-up power supply if applicable)
3.4	Setpoints
3.5	Trended variables
3.6	Variables for Reporting and Logging
3.7	SCADA/HMI display
3.8	Alarm list and priority categorisation
4	**Data Architecture**
4.1	Architecture drawing
4.2	Unified Namespace Configuration and Implementation

Item No	Description of Content
4.3	MQTT topics
4.4	Sparkplug B payload
4.5	Broker Software and Configuration
4.6	Communication and link to enterprise broker
4	**Control Network Architecture**
4.1	Description of Control Network
4.2	Hardware specifications
4.3	Software specifications
5	**Programmable Controllers**
5.1	Configuration
5.2	Hardware
5.3	Networks
5.4	IO list
5.5	Protocols
5.6	Functional blocks design and description
6	**SCADA/HMI**
6.1	SCADA Configuration
6.2	Tags List with Tag count
7	**SCADA/HMI Mimics**
7.1	Plant Overview
7.2	Navigation Bar
7.3	Sub Plant overviews (if applicable)
7.4	Functional Unit Overview
7.5	System Page
7.6	Comms Network (based on network architecture)
7.7	Electrical Distribution and Generation Network
7.8	Instrument Overview Screen
7.9	Symbol colours
8	Process Unit/Drive/Instrumentation/valves faceplates
8.1	Process sequence pages
8.2	Alarms Page
8.3	PID Control Loops and Set point pages
8.4	Trending
9	**Alarm Management**
9.1	Alarm Philosophy
10	**Historian**
10.1	Configuration
11	**Datawarehouse**
11.1	Extract Transform Load Procedures
11.2	Data model
11.3	Data Maintenance Scheduling (e.g. storing, archiving of data and log file)
12	**Reporting**
12.1	Metric KPI list
12.2	Realtime visualisation

Item No	Description of Content
12.3	Business intelligence visualisation
12.4	Report and Dashboard Design (see Electronic Specs for dashboard list)
13	**Security**
13.1	Cybersecurity design (VPN, reverse proxy, TLS, SSL)
13.2	Authentication Access Control
13.3	Access Hierarchy

3.2.5.8 APPROVALS AND INSPECTIONS

(a) Method Statements

The Contractor shall be required to prepare method statements subject to the approval of the Engineer and Client for the installation of equipment on any structures, or prior to the pre-commissioning or commissioning of any equipment.

(b) Approvals before Manufacturing and Inspections

All drawings which are to be submitted in terms of the Contract shall be approved in principle by the Engineer before any manufacturing or inspection of manufactured or supplied items commences. All items and equipment for incorporation into the works shall be approved by the Engineer prior to placements of orders. Refer to Clause 5 of the Conditions of Contract for further information in this regard.

(c) Quality Control Plans

Quality Control Plans (QCP's) of all manufactured items shall be submitted to the Engineer for approval prior to the start of any manufacturing. The Engineer shall review these QCP's and identify any hold points which he deems necessary for the specific item of equipment. The necessary hold points identified by the Engineer shall be taken into consideration and failure to adhere to any hold points shall constitute a failure of approval and any costs incurred in this regard shall be borne by the Contractor.

(d) Inspections

Inspections will be done in accordance with sub-clauses 7.3 and 7.4 of the Conditions of Contract. The Contractor shall arrange timeously with the Engineer for any inspections, at least 5 working days in advance. The inspections carried out by the Engineer shall not absolve the Contractor from his responsibilities with regards to the correctness of any of the Works.

(e) Workshop Facilities

The Contractor shall set up a workshop facility for technical support and repairs, within 90 days of the final award of the Contract. The Engineer shall inspect this facility and ensure that it is in accordance with Returnable Schedule 14.

3.2.5.9 HAZOP STUDY

The Contractor shall conduct a HAZOP study when the P&IDs and Control Philosophy documents have been finalised.

The Contractor shall employ a suitably experienced and independent consultant approved by the Engineer to lead the study in accordance with generally accepted industry practice. The consultant shall provide a report detailing the findings of the study. The study shall be undertaken at a suitable location once the Contractor's Process and Instrumentation Diagrams and Control Philosophy have been approved by the Engineer for this purpose.
The Contractor's P&IDs shall be modified by the Contractor to reflect the decisions reached.

The Contractor's project manager, the mechanical engineering designer and the electrical engineering designer shall be present for the full duration of the study. Representatives of the Employer responsible for planning, design, maintenance, and operation will also be present.

3.2.5.10 HAZARDOUS AREA CLASSIFICATION STUDY

The Contractor shall appoint a specialist (competent person in risk assessments) to undertake a hazardous area classification study for the Works.

The hazardous area study shall identify all hazardous locations and classify them in accordance with SANS 10108 (and the relevant health and safety standards – e.g., the South African Health and Safety Act 1993 (Act No. 85 of 1993), Electrical Machinery Regulations, Pressure Equipment Regulations, etc.).

The following areas are anticipated to be classified as hazardous locations:

- Fuel storage and management areas
- Biogas (CHP) plant, including generators (engines), biogas storage, biogas handling, biogas conditioning
- Anaerobic digesters and digested sludge storage tanks
- Chlorine plant
- Boiler house
- Primary sludge storage and pumping.

All mechanical, electrical and electronic equipment shall be rated accordingly to match the hazardous areas. Equipment shall be priced for accordingly at tender stage.

For pricing purposes, Zone 2 rated equipment shall be assumed for the abovementioned process areas.

3.2.5.11 INFORMATION MODELLING

The Contractor shall develop an information model of the mechanical and electrical design that shall include a 3D model with metadata, P&IDs, drawings, equipment and instrumentation lists and other information elements that shall be updated during construction to an as-built information model.

A preliminary model element breakdown (MEB) will be given to the Contractor at the start of construction. This MEB will form the basis for the design of the M&E. The MEB will be based on the Uniclass Classification. The Contractor shall review this MEB during his design process and update according to his design.

As part of the MEB the Contractor shall develop the information requirements for the MEB which shall include but not limited to the following information:

Item	Information Required
Motors, Actuated Valves, Manual Valves, Instrumentation, Manual Gauges	Uniclass code Tagname Description Make Model Rating (if applicable) Service Interval Run hours

Pipework	Uniclass code Tagname Description Material Diameter PN Rating

The updated MEB and information requirements shall be submitted to the Engineer for approval before modelling may start.

Once the MEB is approved all the elements in the MEB shall be modelled in 3D design software. Revit and Inventor (for shop drawing detail) is preferred. The M&E 3D model shall serve as the single point of truth for M&E data (as defined above). It shall serve as the source for equipment and instrument lists. GA drawings and shop drawings shall be produced from the model. P&IDs, schematics and other diagrammatic drawings shall be linked to the 3D model by using unique tag IDs.

The M&E 3D model shall be updated weekly and coordinated with the Civil 3D model (developed by the Employer). The M&E model and Civil model will be federated into a single model in a web based common data environment (CDE). The model shall be used by the Contractor to coordinate construction activities and in design workshops and technical meetings with the Engineer.

The Contractor's Information Modelling leader shall be experienced (at least 5 years) and accredited in information modelling. The Contactor shall provide proof of accreditation and project experience during Construction.

The P&IDs shall be developed in design software that allows the back-end database to be queried.

C3.3 Procurement

CONTENTS

3.3.1 PREFERENTIAL PROCUREMENT
3.3.2 SUB-CONTRACTING PROCEDURES

3.3.1 PREFERENTIAL PROCUREMENT

The Works shall be executed in accordance with the conditions associated with the granting of preferences detailed in the **Preference Schedule** where preferences are granted in respect of B-BBEE contribution.

Financial penalties, as described in the **Preference Schedule**, shall be applied in the event that the Contractor is found to have breached and of the conditions contained in the **Preference Schedule** (unless proven to be beyond the control of the Contractor).

Notwithstanding the application of penalties, the Contractor's attention is drawn to other sanctions that may be applied by the Employer (listed in the **Preference Schedule**) with due consideration to the circumstances.

3.3.2 SUB-CONTRACTING PROCEDURES

3.3.2.1 MONITORING THE USE OF SUB-CONTRACTORS

Notwithstanding the restriction on sub-contracting as described on the **Preference Schedule**, it is recognised that sub-contracting is an integral part of construction, which the conditions of contract make provision for.

In order, however, to comply with the requirements of the **Preference Schedule**, the Contractor shall submit to the Engineer, on a monthly basis, a **B-BBEE Sub-Contract Expenditure Report**. The format of this report is provided in Annex 2 attached.

The Contractor shall submit to the Engineer documentary evidence in accordance with the applicable codes of good practise, of the B-BBEE status level of every sub-contractor employed by the Contractor. Until such time as documentary evidence as described above has been submitted to the Engineer, a sub-contractor shall be deemed to be a non-compliant contributor.

The Contractor shall furthermore, on the written request of the Engineer, provide documentary evidence showing the value of work sub-contracted to any or all of the sub-contractors employed by the Contractor.

3.3.2.2 PROCEDURE FOR THE SELECTION OF SUB-CONTRACTORS/SUPPLIERS

Where monetary allowances for provisional sums or prime costs items have been provided in the Bills of Quantities, and where the work or items to which the allowances relate are to be executed/supplied by sub-contractors/suppliers, then the following selection process shall be followed in respect of the required sub-contractors/suppliers:

Where the monetary allowance is less than or equal to R300 000, the Contractor shall invite three quotations from suitably qualified sub-contractors/suppliers for the required work or items. The selection of the three sub-contractors/suppliers shall be in consultation with, and to the approval of the Engineer. The evaluation of the quotations received must include a preference points system as described in C.3.11 of the Tender Data.

Where the monetary allowance is in excess of R300 000, an open competitive tender process shall be followed in respect of the selection of a sub-contractor/supplier for the required work or items. In such circumstances, tender documentation will be prepared by the Engineer in consultation with and to the approval of the Contractor, invitations to tender will be advertised in the media by the Engineer on behalf of the Contractor, and a sub-contractor/supplier will be selected from the responses received, by the Contractor and Engineer in consultation. The evaluation of the offers received must include a preference points system as described in C.3.11 of the Tender Data. The Contractor must satisfy itself that the selected sub-contractor/supplier can meet the requirements of the sub-contract /supply agreement and may, on reasonable grounds, elect not to employ a particular sub-contractor/supplier.

In both instances above (less than or equal to R300 000 or in excess of R300 000), the contractual relationship between the Contractor and sub-contractor/supplier shall be as described in the Conditions of Contract.

C3.4 Construction

CONTENTS

3.4.1 TRADE NAMES OR PROPRIETARY PRODUCTS
3.4.2 APPLICABLE STANDARDISED SPECIFICATIONS
3.4.3 PARTICULAR / PROJECT SPECIFIC SPECIFICATIONS
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3.4.10 SITE-RELATED ITEMS
3.4.11 CONSTRUCTION EQUIPMENT
3.4.12 SITE USAGE
3.4.13 OTHER CONTRACTORS
3.4.14 CONSTRUCTION RESTRICTIONS

3.4.1 TRADE NAMES OR PROPRIETARY PRODUCTS

Bid specifications may not make any reference to any particular trade mark, name, patent, design, type, specific origin or producer, unless there is no other sufficiently precise or intelligible way of describing the characteristics of the work, in which case such reference must be accompanied by the words “or equivalent”.

TENDERERS MUST NOTE THAT WHEREVER THIS DOCUMENT REFERS TO ANY PARTICULAR TRADE MARK, NAME, PATENT, DESIGN, TYPE, SPECIFIC ORIGIN OR PRODUCER, SUCH REFERENCE SHALL BE DEEMED TO BE ACCOMPANIED BY THE WORDS ‘OR EQUIVALENT”

3.4.2 APPLICABLE STANDARDISED SPECIFICATIONS

All works under the scope of works shall comply with the following Specifications and the latest relevant SANS, BS or ISO standards where applicable:

Standard Specification for Mechanical Works (including General Works) is included in Volume 3A)

Standard Specification for LV and Electrical Works (including General Works) is included in Volume 3B

Standard Specification for MV Electrical Works is included in Volume 3B

3.4.3 PARTICULAR / PROJECT SPECIFIC SPECIFICATIONS

All works under the scope of works shall comply with the following Specifications and the latest relevant SANS, BS or ISO standards where applicable:

Detailed Mechanical Specification (including General Works is included in Volume 3A

Detailed Electrical Specification (including General Works) is included in Volume 3B

Detailed Electronic Specification (including General Works is included in Volume 3B)

General Specification SPE-II-0007 – Instrumentation is included in Volume 3B

Electrical and Electronic Design Schedules is included in Volume 3B

Asset Numbering System is included in Volume 3B

Standard for Standby Supply Soft Load Transfer Scheme is included in Volume 3B

Technical Standard for the Interconnection of Embedded Generation is included in Volume 3B

General Specification SPE-EP-0024 – NECRT is included in Volume 3B

General Specification SPE-EE-0015 - Street and Area Lighting is included in Volume 3B

Particular Specification G: Environmental Management Specification and its Annexures are included in Volume 3A

Particular Specification H: Health and Safety Specification is in Volume 3A.

3.4.4 WAYLEAVES, PERMISSIONS AND PERMITS

The Contractor shall be responsible for obtaining all of the necessary wayleaves, permissions or permits applicable to working near any existing services or other infrastructure on Site, and shall ensure that any wayleaves, permissions or permits obtained by the Engineer prior to the award of the contract are transferred into the Contractor's name.

The Contractor shall abide by any conditions imposed by such wayleaves, permissions or permits.

The Contractor shall ensure that all wayleaves, permissions and permits are kept on site and are available for inspection by the relevant service authorities on demand.

The Contractor shall also ensure that any wayleaves in respect of electricity services are renewed timeously every three months.

3.4.5 LOCAL PRODUCTION AND CONTENT

Not applicable to this tender.

3.4.6 EMPLOYMENT OF SECURITY PERSONNEL

All security staff employed by the contractor on behalf of the CCT or at any CCT property must be registered with Private Security Industry Regulatory Authority (PSiRA). Proof of such registration must be made available to the employer's agent upon request.

3.4.7 UNIVERSAL ACCESS

In pursuit of becoming a fully accessible city, the City of Cape Town expects all Consultants and Service Providers to design and construct to SANS Standards for accessible Design, and any relevant City of Cape Town documents as may be relevant, and to exhibit a commitment to employing Universal Design Principles in their design, construction, service and product delivery of construction projects. This applies to all projects whether new, temporary, upgrades or rehabilitation works.

The Contractor will engage with project representatives and the CCT's Universal Accessibility Department on how Universal Design Principles will enhance accessibility, within this project, that meets a variety of needs and creates a city that is accessible to everyone.

3.4.8 EXISTING SERVICES

3.4.8.1 Known services

A potable water supply and power supply to the site exists. The Contractor shall inform the Engineer immediately if services other than those shown on the drawings are detected.

3.4.8.2 Damage to services

The Contractor shall repair or arrange to immediately repair any damage to the existing services at his own cost if the damage was caused by the Contractor during the construction process.

3.4.8.3 Reinstatement of services and structures damaged during construction

The Contractor shall immediately inform the Engineer of any damage to existing services or structures.

3.4.9 PLANT AND MATERIALS

3.4.9.1 PLANT AND MATERIALS SUPPLIED BY THE EMPLOYER

The Employer shall not supply any plant or materials.

3.4.9.2 MATERIALS, SAMPLES AND SHOP DRAWINGS

(a) Samples

Materials or work which does not conform to the approved samples submitted in terms of Sub-clause 7.3 of the Conditions of Contract will be rejected. The Engineer reserves the right to submit samples to tests to ensure that the material represented by the sample meets the specification requirements.
The costs of any such tests conducted by or on behalf of the Engineer, the results of which indicate that the samples provided by the Contractor do not conform to the requirements of the Contract, shall, in accordance with the provisions of Sub-clause 7.5 of the Conditions of Contract, be for the Contractor's account.

3.4.10 SITE-RELATED ITEMS

3.4.10.1 SERVICES AND FACILITIES PROVIDED BY THE EMPLOYER

(a) Water sources

The responsible water supply authority in the area of the Site is the CCT.

Should the Contractor, in complying with his obligations in terms of Sub-clause C3.4.9.2(b): Water, wish to utilise such water supply, he shall himself be responsible for making his own arrangements with the responsible water supply authority for the supply of all water that he may require from such reticulation network for construction purposes as well as for domestic consumption.

If so, required by the responsible water supply authority, the Contractor shall further be responsible, at his own cost, for making or otherwise providing metered connections to the available services at the positions specified by the water authority, as well as for the removal of such connections on completion of the Contract.

No warranty is offered or given by the Employer that the existing available reticulated water supply will necessarily be adequate for the Contractor's purposes nor that such supply is in any way guaranteed.

All charges as may be levied by the responsible water supply authority in respect of water consumed by the Contractor shall be for the Contractor's account and payment to the Contractor in respect thereof shall, in accordance with the provisions of Sub-clause C3.4.9.2(b), be deemed to be included in the sums tendered by the Contractor for the various Preliminary and General items listed in the Bill of Quantities, as well as in the rates tendered by the Contractor for the various other items listed in the Bill of Quantities which require the consumption of water.

The Contractor shall, when reasonably required by the Engineer, produce documentary proof that all amounts as may have become due and payable by the Contractor to the responsible water authority have been promptly paid in full.

(b) Electricity supply

A reticulated electrical power supply is available in the vicinity of the Site.

The responsible electricity supply authority in the area of the Site is the CCT.

Should the Contractor, in complying with his obligations in terms of Sub-clause C3.4.9.2(c): Electricity, wish to avail himself of such supply, he shall, in accordance with the provisions of Sub-clause C3.4.9.2(c), and at his own cost, be responsible for making his own arrangements with the responsible electricity supply authority for the supply of all electrical power he may require from such reticulation network for construction purposes as well as for domestic consumption.

If so, required by the responsible electricity supply authority, the Contractor shall, at his own cost, be responsible for making metered connections to the available services at the positions specified by the electricity supply authority, as well as for the removal of such connections on completion of the Contract.

No warranty is offered or given by the Employer that the existing available reticulated electrical power supply will necessarily be adequate for the Contractor's purposes nor that its supply is in any way guaranteed.

All charges as may be levied by the responsible electricity supply authority in respect of electrical power consumed by the Contractor shall be for the Contractor's account and payment to the Contractor in respect thereof shall, in accordance with the provisions of Sub-clause C3.4.9.2(c), be deemed to be included in the sums tendered by the Contractor for the various Preliminary and General items listed in the Bill of Quantities, as well as in the rates tendered by the Contractor for the various other items listed in the Bill of Quantities which require the consumption of electricity.

The Contractor shall, when reasonably required by the Engineer, produce documentary proof that all amounts as may have become due and payable by the Contractor to the responsible electricity supply authority have been promptly paid in full.

(c) Excrement disposal

The responsible sewage disposal authority is the CCT.

Should the Contractor, in complying with his obligations in terms of Sub-clause C3.4.9.2(d): Excrement disposal, wish to avail himself of such facility, he shall, in accordance with the provisions of Sub-clause C3.4.9.2(d), and at his own cost, be responsible for making his own arrangements with the responsible disposal authority, and for making such connections he may require to the available services.

If so, required by the responsible sewage disposal authority, the Contractor shall, at his own cost, be responsible for making connections to the available services at the positions specified by the sewage disposal authority, as well as for the removal of such connections on completion of the Contract.

No warranty is offered or given by the Employer that the existing available reticulated water-borne sewage disposal will necessarily be adequate for the Contractor's purposes nor that its operation is in any way guaranteed.

All charges as may be levied by the responsible sewage disposal authority in respect of the disposal of sewage generated by the Contractor shall be for the Contractor's account and payment to the Contractor in respect thereof shall, in accordance with the provisions of sub-clause C3.4.9.2(d), be deemed to be included in the sums tendered by the Contractor for the various Preliminary and General items listed in the Bill of Quantities.

The Contractor shall, when reasonably required by the Engineer, produce documentary proof that all amounts that may have become due and payable by the Contractor to the responsible sewage disposal authority have been promptly paid in full.

(d) Area for contractor's site establishment

A specific area in close proximity to or on the Site of the Works will be made available by the Employer to the Contractor for the Contractor's site establishment. The specific area for the Contractor's site establishment will be identified to the Contractor by the Engineer and the Contractor shall have sole use of such area, free of charge, for the duration of the Contract. The Contractor shall use this area only for the purposes of erecting his site offices, workshops, stores and other facilities required for the execution of the Contract. The Contractor shall not use the area nor allow it to be used for any purposes not directly associated with the execution of the Contract.

The Contractor shall be responsible for arranging, at his own cost, for the provision of all services he may require in the area, as well as elsewhere on the Site.

Should the Contractor deem the area made available by the Employer to be inadequate or unsuitable for the Contractor's particular needs, then the Contractor shall be at liberty to make his own arrangements with the owners of other sites which he considers are better suited to his needs; provided always that the use by the Contractor of any area other than that made available to him by the Employer shall be subject to the prior written approval of the Engineer, which approval shall not be unreasonably withheld; and provided further that the Contractor shall have no claim against the Employer in respect of any costs incurred by him, either directly or indirectly in consequence of utilising any area other than that made available to him by the Employer, and which costs exceed those costs allowed for by the Contractor in his Tender. The approval of any area proposed by the Contractor will be subject to the conditions of the Environmental Authorisation received for the Project.

3.4.10.2 FACILITIES TO BE PROVIDED BY THE CONTRACTOR

(a) Facilities for the Engineer

The Contractor shall provide on the Site, for the duration of the Contract and for the exclusive use of the Engineer and/or his Representative (as applicable), the various facilities described hereunder. All such facilities shall be provided promptly on the commencement of the Contract and failure on the part of the Contractor to provide any facility required in terms of this specification shall constitute grounds for the Engineer to withhold payment of the Contractor's tendered Preliminary and General items until the facility has been provided or restored as the case may be.

1. Site Offices

The Contractor shall supply and furnish four (4) air-conditioned "Kwikjack" or equivalent approved (6m x 3m) site offices, internal size of at least 15 m² each. Each container to include a toilet (provision for separate male and female) for the exclusive use of the Engineer and his staff. The toilet shall have a connection to water borne sanitation system (no chemical toilets) and have a hand wash basin and liquid soap dispenser. The Contractor must provide the following per site office: two suitable office desks, internet connectivity (WIFI), lockable drawers, four office chairs, two "Barhold" or equivalent wall-mounted racks with 6 clamps suitable for hanging A0 sized drawings, electric lighting, air-conditioning (minimum 18,000 BTU for each split unit type), minimum of one plug (15A each), one kettle, one 100 ℓ (minimum) fridge, a microwave oven (28 ℓ, 900 W minimum), a lockable plan cupboard as well as windows fitted with blinds, burglar bars and fly screens over the openings, for the exclusive use of the Engineer, Engineer's Representative and assistant. A wash sink, other than the one provided for ablutions, shall be provided for washing of dishes. A concrete floor will be permitted for the office provided that it is covered with linoleum. The roof and walls should be insulated.

The Engineer, the Engineer's Representative and assistants shall be allowed free use of all the Contractor's site facilities.

The Engineer, the Engineer's Agent's Representative and assistant shall be allowed free use of survey equipment and assistants to carry out control work as and when required, and the Contractor shall provide all pegs, concrete, tools and other necessary items as well as all necessary labour for excavation, bush clearing, mixing and placing of concrete, as and when required for the control of the setting out of the Works.

The offices shall have a clean and neat appearance throughout.

The Contractor shall arrange for the offices and facilities to be cleaned daily.

2. Carports

Six (6) shaded carports (6m x 3m wide), with a free draining, wearing course floor. The roof must be built in such a way that a vehicle will always be shielded against the sun throughout the day.

(b) Water

The Contractor shall, at his own expense, be responsible for obtaining and distributing all water as may be required for the purposes of executing the Contract, including water for both construction purposes and domestic use, as well as for making all arrangements in connection therewith. The Contractor shall further, at his own expense, be responsible for providing all necessaries for procuring, storing, transporting and applying water required for the execution of the Contract, including but not limited to all piping, valves, tanks, pumps, meters and other plant and equipment, as well as for all work and superintendence associated therewith.

The sources of all water utilised for the purposes of the Contract shall be subject to the prior approval of the Engineer, which approval shall not be unreasonably withheld.

The Contractor shall comply with all prevailing legislation in respect of drawing water from natural and other sources and shall, when required by the Engineer, produce proof of such compliance. The distribution of water shall be carried out by the Contractor strictly in accordance with the applicable laws and regulations.

All water provided by the Contractor for construction purposes shall be clean, free from undesirable concentrations of deleterious salts and other materials and shall comply with any further relevant specifications of the Contract. The Contractor shall, whenever reasonably required by the Engineer, produce test results demonstrating such compliance. Water provided by the Contractor for human consumption shall be healthy and potable to the satisfaction of the health authorities in the area of the Site. No separate payment will be made to the Contractor for the obtainment, distribution and consumption of water, the costs of which will be deemed to be included in the Contractor's tendered rates.

As part of the operation and training portion of the Contract, the Contractor may use the Employer's existing water supply and shall not be charged for reasonable use for the execution of tasks that fall under this Contract.

(c) Electricity

The Contractor shall, at his own expense, be responsible for obtaining and distributing all electricity as he may require for the purposes of executing the construction portion of the Contract, including electricity for both construction purposes and domestic use, as well as for making all arrangements in connection therewith.

The distribution of electricity shall be carried out by the Contractor strictly in accordance with the applicable laws and regulations.

No separate payment will be made to the Contractor for the obtainment, distribution and consumption of electricity, the costs of which will be deemed to be in the Contractor's tendered rates and prices.

As part of the operation and training portion of the Contract, the Contractor may use the Employer's existing electricity supply and shall not be charged for reasonable use for the execution of tasks that fall under this Contract.

(d) Excrement disposal

The Contractor shall, at his own expense, be responsible for safely and hygienically dealing with and disposing of all human excrement and similar matter generated on the Site during the course of the Contract, to the satisfaction of the Engineer and the responsible health authorities in the area of the Site.

The Contractor shall further comply with any other requirements in this regard as may be stated in the Contract.

No separate payment will be made to the Contractor in respect of discharging his obligations in terms of this sub-clause and the costs thereof shall be deemed to be included within the Contractor's tendered Preliminary and General Items.

As part of the operation and training portion of the Contract, the Contractor may make use of the Employer's existing sanitation facilities. The Contractor shall ensure his personnel maintain these facilities in a good condition and shall always adhere to acceptable hygienic standards. The Employer shall reserve the right to revoke access to these facilities for the Contractor's personnel should they fail to adhere to acceptable hygienic standards. Should access to sanitary facilities be revoked, the Contractor shall make alternate arrangements for sanitary use by his workmen.

(e) Security

The Contractor may be exposed to criminal actions, including theft and vandalism, and shall make the necessary security arrangements for the duration of the Contract. The Contractor shall, as a minimum, enclose the whole camp with a security fence. The Contractor shall remove the fencing and shall rehabilitate the camp site areas on completion of the Contract.

3.4.10.3 FEATURES REQUIRING SPECIAL ATTENTION

(a) Site maintenance

During progress of the work and upon completion thereof, the Site of the Works shall be kept and left in a clean and orderly condition. The Contractor shall store materials and equipment for which he is responsible in an orderly manner and shall keep the Site free from debris and obstructions.

(b) Subcontractors

All matters pertaining to subcontractors (including Nominated Subcontractors) and the work executed by them shall be dealt with directly between the Engineer and the Contractor in the context of all subcontract work being an integral part of the Works for which the Contractor is responsible. The Contractor is responsible for work carried out on his behalf by Subcontractors.

The Engineer will not liaise directly with any subcontractors, nor will he issue instructions concerning the subcontract works directly to any subcontractor.

All matters arising from the subcontract agreements shall be dealt with directly between the Contractor and the subcontractors and the Engineer will not become involved.

Any problems related to payments, programming, workmanship, etc. shall be the concern of the Contractor and the Subcontractor, and the Engineer will not be involved.

(c) Access to properties

The Contractor shall organise the work to cause the least possible inconvenience to the public and to the property owners adjacent to or affected by the work, and except as hereunder provided, shall at all times provide and allow pedestrian and vehicular access to properties within or adjoining or affected by the area in which he is working. In this respect the Contractor's attention is drawn to Clause 4.13 of the Conditions of Contract.

If, as a result of restricted road reserve widths and the nature of the work, the construction of bypasses is not feasible, construction shall be carried out under traffic conditions to provide access to erven and properties.

Notwithstanding the aforementioned, the Contractor may, with the prior approval of the Engineer (which approval shall not be unreasonably withheld), make arrangements with and obtain the acceptance of the occupiers of erven and properties to close off part of a street, road, footpath or entrance temporarily, provided that the Contractor duly notifies the occupiers of the intended closure and its probable duration, and reopens the route as punctually as possible. Where possible, such streets, roads, footpaths and entrances shall be made safe and reopened to traffic overnight. Such closure shall not absolve the Contractor from his obligations under the Contract to provide access at all times. Barricades, traffic signs, drums and other safety measures appropriate to the circumstances shall be provided by the Contractor to suit the specific conditions.

(d) Monthly statements and payment certificates

The statement to be submitted by the Contractor in terms of Clause 14.3 of the Conditions of Contract shall be prepared by the Contractor at his own cost, strictly in accordance with the standard payment certificate prescribed by the Engineer, in digital electronic computer format. The Contractor shall submit to the Engineer the digital electronic computer file of the statement.

For the purposes of the Engineer’s payment certificate, the Contractor shall subsequently be responsible, at his own cost, for making such adjustments to his statement as may be required by the Engineer for the purposes of accurately reflecting the actual quantities and amounts which the Engineer deems to be due and payable to the Contractor in the payment certificate.

The Contractor shall, at his own cost, make the said adjustments to the statement and return it to the Engineer within three (3) normal workings days from the date on which the Engineer communicated to the Contractor the adjustments required. The Contractor shall submit to the Engineer the electronic digital computer file which includes the adjusted statement.

Any delay by the Contractor in making the said adjustments and submitting to the Engineer the requisite adjusted statement for the purposes of the Engineer’s payment certificate will be added to the times allowed to the Engineer in terms of Clause 14.6 of the Conditions of Contract to submit the signed payment certificate to the Employer and the Contractor. Any such delay will also be added to the period in which the Employer is required to make payment to the Contractor.

PROCESS CONTROL: ASSISTANCE AND MAINTENANCE OF WORKS (FULL TIME):

Payment for Process Control: Assistance, Maintenance and Training scheduled items shall be read in conjunction with the Project Specifications (Part C3.1.10) and shall conform to payment clauses as stated herein under.

OMT1. Preliminary and General Items

Unit ..... Sum

Where provision is made in the Bill of Quantities for Preliminary and General items, the sum(s) tendered shall cover the cost of all responsibilities specified in the Specifications together with all responsibilities in terms of the Conditions of Contract. In interim certificates, payment for Preliminary and General Items will be made, unless otherwise provided for, as a percentage of the tendered lump sum(s) pro-rated to the value of work certified for payment. Note that the Preliminary and General Items in Bill M35 are for **twelve (12)** months process control assistance, maintenance and training (full time) where the Contractor’s staff shall be based full time on site during the defects notification period.

OMT2. Process Control Assistance and Maintenance of Works (Full time)

Unit ..... Month

The tendered rate or sum shall be payable monthly to the Contractor in accordance with the requirements specified in the Project Specifications.

The tendered rate shall include full compensation for all liabilities and obligations described or implied in the Project Specifications and deemed by the Contractor to be applicable to the maintenance of an entire installation and all appurtenant works deemed to form part thereof, as defined in the Project Specifications.

Remuneration for all value-related as well as all time-related preliminary and general charges shall be deemed included in the Contractor's monthly operation costs.

OMT3. Process Control and Maintenance Training of Works Personnel (including Certification)

(a) Development of a Syllabus for Training of Operators

Unit ..... Sum

The unit of measurement shall be the sum for the compilation of a training syllabus for each installation. The training material shall be revised and update at the end of the training contract before the Municipality takes ownership of the training material.

The tendered amount shall include full compensation for identification of pre-qualification criteria and training needs, staff assessment and evaluation prior to training, all technical research, development and compilation of an approved training course and course material, and all other actions necessary for commencement of official training sessions in accordance with the specification.

The tendered amount shall also include full compensation for the compilation of a draft syllabus and for incorporation of all the Engineer's comments and corrective requirements.

(b) Presenting a Training Course for Operators

Unit .....Sum

The unit of measurement shall be the sum for the number of training courses presented based on the approved syllabus.

The tendered rate shall include full compensation for presenting a training course, including lectures, demonstrations, on-site training and hands-on development and improvement of operators' skills to enable the operators to operate installations safely and efficiently.

The tendered rate shall include full compensation for the Contractor's time, appointment of the accredited trainer for the course, and for all material expenses such as paper hand-outs and slides for the whole group of trainees, the number of which shall be determined during development of the training course.

(c) Presenting a Training Course for Maintenance Personnel (mechanical and electrical)

Unit ..... Sum

The unit of measurement shall be the sum for the number of training courses presented.

The tendered rate shall include full compensation for presenting a course, including lectures, demonstrations, on-site training and hands-on development, and improvement of maintenance personnel's skills to enable them to maintain and repair installations safely and efficiently at the satisfactory functional condition specified.

The tendered rate shall include full compensation for the Contractor's time, appointment of the accredited trainer for the course, and for all material expenses such as paper hand-outs and slides for the whole group of trainees, the number of which shall be determined during development of the training course.

(d) Arranging Demonstration Session(s) for Trainees

Unit ..... Sum

The unit of measurement shall be a sum depending on the number of demonstration sessions arranged. This will depend on the number of trainees that underwent training.

The tendered rate shall include full compensation for any reasonable costs arising from the arrangement of demonstration sessions but shall exclude any time related claims for the course presenter(s) as this shall be assumed to be covered under (b) and (c) above.

OMT4. Compensation in terms of Clause 19.1, 19.6 (c) and 19.6(d) of the FIDIC Conditions of Contract – 1999, for delays incurred

(a) Plant and equipment……...……Unit: Sum per working day

(b) Labour……..……....……..……..……....Unit: Sum per working day

(c) Supervision……..……..……....Unit: Sum per working day

(d) Other services, facilities, etc. not covered by (a), (b) and (c) above…..Unit: Sum per working day

The sum tendered for each item shall cover the full and final costs of delaying the specified resource or facility and no additional compensation shall apply, notwithstanding any provisions to the contrary in the contract document in respect of any extension of time granted in relation to the circumstances described in Clauses 19.1, 19.6 (c) and 19.6(d) of the FIDIC Conditions of Contract – 1999.

For the purposes of calculating the total delay, a working week shall consist of 5 working days and a working day 8 hours.

MAINTENANCE INSPECTIONS AFTER DEFECTS NOTIFICATION PERIOD (PART TIME):

Payment for scheduled items shall be read in conjunction with the Project Specifications (Part C3.1.10) and shall conform to payment clauses as stated herein under.

MI1. Preliminary and General Items

Unit ..... Sum

Where provision is made in the Bill of Quantities for Preliminary and General items, the sum(s) tendered shall cover the cost of all responsibilities specified in the Specifications together with all responsibilities in terms of the Conditions of Contract. In interim certificates, payment for Preliminary and General Items will be made, unless otherwise provided for, as a percentage of the tendered lump sum(s) pro-rated to the value of work certified for payment. Note that the Preliminary and General Items in Bill M36 are for a total period of **six (6)** months after the Defects Notification Period where the Contractor's staff shall be based part time on site during this period.

MI2. Maintenance Inspections of Specific Works for a total period of six months after the Defects Notification Period (Part Time)

Unit ..... Month

The tendered rate or sum shall be payable monthly to the Contractor in accordance with the requirements specified in the Project Specifications C3.10.1 and shall account for inspections as defined in the Bill of Quantities.

The tendered rate shall include full compensation for all liabilities and obligations described or implied in the Project Specifications and deemed by the Contractor to be applicable to conduct routine maintenance inspections for the operation of an entire installation and all appurtenant works (as defined in the Bill of Quantities) deemed to form part thereof, as defined in the Project Specifications.
Remuneration for all value-related as well as all time-related preliminary and general charges shall be deemed included in the Contractor's monthly operation costs.

MI3. Call-out charge in response to a breakdown

Unit: ..... No

The unit of measurement shall be a single charge rate per call-out responding to a breakdown. The maximum allowable response-time is applicable (Refer to Part C3.1.10).

The call-out charge rate shall include full compensation for all costs related to travelling, accommodation and labor, inspecting, assessing and reporting of dysfunctional component/s or installation.

MI4. Charge for actual repair work done during breakdown

Unit: ..... Hours

The unit of measurement shall be the number of hours the Contractor spent performing the actual repair work on a dysfunctional component or installation as a result of a breakdown. The rate shall cover all labor, travelling to site, accommodation, dismantling, resetting, calibrating, protecting, recoating, re-assembling, re-installing, testing and re-commissioning of the dysfunctional component or installation.

All consumables, materials, equipment, components and spares required in attending to a breakdown shall be covered by the Prime Cost Sum items allowed for in the Bill of Quantities.

(e) Construction in restricted areas

Working space is sometimes restricted. The construction method used in these restricted areas largely depends on the Contractor's Plant. Notwithstanding, measurement and payment will be strictly according to the specified cross-sections and dimensions irrespective of the method used, and the rates and prices tendered will be deemed to include full compensation for any difficulties encountered by the Contractor while working in restricted areas. Neither extra payment nor any claim for payment due to these difficulties will be considered.

(f) Notices, signs, barricades and advertisements

All notices, signs and barricades, as well as advertisements, may be used only if approved by the Engineer. The Contractor shall be responsible for their supply, erection, maintenance and ultimate removal and shall make provision for this in his tendered rates.

The Engineer shall have the right to instruct the Contractor to move any sign, notice or advertisement to another position, or to remove it from the Site of the Works if in his opinion it is unsatisfactory, inconvenient or dangerous.

(g) Workmanship and quality control

The onus to produce work that conforms in quality and accuracy of detail to the requirements of the Specifications and Drawings rests with the Contractor, and the Contractor shall, at his own expense, institute a quality control system and provide suitably qualified and experienced engineers, foremen, surveyors, materials technicians, other technicians and technical staff, together with all transport, instruments and equipment to ensure adequate supervision and positive control of the Works at all times.

The cost of supervision and process control, including testing carried out by the Contractor, will be deemed to be included in the rates tendered for the related items of work.

The Contractor's attention is drawn to the provisions of the various Standardized Specifications regarding the minimum frequency of testing required. The Contractor shall, at his own discretion, increase this frequency where necessary to ensure adequate control.

On completion and submission of every part of the work to the Engineer for examination and measurement, the Contractor shall furnish the Engineer with the results of the relevant tests, measurements and levels to demonstrate the achievement of compliance with the Specifications.

(h) Dealing with Water

The Contractor shall deal with water on the Site so that the Works are kept sufficiently dry for their proper execution. The Contractor shall:

a) Prevent flooding of the Works and by the Works
b) Keep all completed Works properly drained
c) Not inhibit surface drainage
d) Manage and dispose of water; which shall include for by-pass arrangements, temporary earthworks, cofferdams, pumping equipment, well-pointing, de-watering equipment etc., and for dealing with all possible flows whether or not the existing flow path is being interfered with during construction
e) Note that the Contractor under this contract shall be responsible for dewatering of the tanks during installation of mechanical equipment.

The onus to produce work that conforms in quality and accuracy of detail to the requirements of the Specifications and Drawings rests with the Contractor, and the Contractor shall, at his own expense, institute a quality control system and provide suitably qualified and experienced.

3.4.11 CONSTRUCTION EQUIPMENT

3.4.5.11.1 REQUIREMENTS FOR EQUIPMENT

The Contractor shall supply all the plant and equipment required and all plant and equipment shall comply with the requirements as stipulated in the Environmental and Occupational Health and Safety Act and the Construction Regulation Act (2014).

3.4.5.11.2 EQUIPMENT PROVIDED BY THE EMPLOYER

The Employer shall supply no plant, material or equipment.

3.4.12 SITE USAGE

Access to site shall be limited to the contractor, his personnel and authorised operational staff. The contractor shall be responsible to control unauthorized entry to the site and shall inform the Engineer of any breach of such rules. The site shall be managed and used for its intended purpose.

It must further be noted that the Macassar WWTW must perform satisfactory in terms of its effluent standards and the Employer's employees shall require access to all parts of the treatment works for normal or emergency duties and work.

3.4.13 OTHER CONTRACTORS

As discussed in Part C3.1 (Description of Works), Clause 3.1.9, other contractors (civil) will be engaged by the Employer and will be present on site during the period of the contract.

The contractor shall arrange or adjust as necessary, the sequence of its work so as not to delay the programmes of the other contractors. The programmes of the other contractors will be made available at the offices of the engineer for perusal within two weeks upon commencement of the contracts.

3.4.14 CONSTRUCTION RESTRICTIONS

The Contract will be subject to construction restrictions. The aforementioned will need to be considered for programming and planning requirements as stipulated in Clause C3.5.7 (Part C3.5: Management) of this Contract Document. The Works must at all times during the construction of the Contract, remain operational in such a way so as to at least achieve the treatment performance currently achieved by the existing Works before construction began. This means that an existing process unit (or equipment associated with the process unit) in a treatment step can only be taken offline if that treatment step is not taken offline completely, permanently or with irreversible effects. Guidance from the Engineer can be sought in this respect. Further, where such works is programmed, the Contractor will be required to submit a Method Statement to the Engineer for approval.

Furthermore, once new equipment and process units are brought into operation to replace existing equipment or process units, the new equipment and/or process units may need to remain operation to ensure treatment. Due to the nature of a wastewater treatment plant, it may be necessary to commission equipment/process units at different stages to achieve the development of the treatment process and its parameters. As such, it is noted that the Contractor should expect that the commissioning of equipment/process units will not occur simultaneously, and that equipment/process unit will be in operation prior to the rest of the works. This does not constitute the Employer taking over the works and the works must be complete in its entirety and the treatment process (including all the necessary ancillaries) operational prior to the Employer taking over.

C3.5 Management

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3.5.1 FORMS FOR CONTRACT ADMINISTRATION

The Contractor shall complete, sign and submit with each monthly statement for payment, the following updated returns (the format of which are attached in C3.7 Annexes as amended from time to time):

a) Monthly Project Labour Report (Annex 1)
b) B-BBEE Sub-Contract Expenditure Report (Annex 2)
c) Joint Venture Expenditure Report (Annex 3)
d) Targeted Labour Contract Participation Expenditure Report (Annex 4)
e) Targeted Enterprises Contract Participation Expenditure Report (Annex 5)

The Monthly Project Labour Report must include details of all labour (including that of sub-contractors) that are South African citizens earning less than **R350.00** per day, as adjusted from time to time (excluding any benefits), who are employed on a temporary or contract basis on this contract in the month in question.

In addition to the Monthly Project Labour Report the Contractor shall simultaneously furnish the Engineer with copies of the signed employment contracts entered into with such labour, together with certified copies of identification documents, proof of attendance in the form of attendance register or timesheets as well as evidence of payments to such labour in the form of copies of payslips or payroll runs. If the worker is paid in cash or by cheque, this information must be recorded on the envelope and the worker must acknowledge receipt of payment by signing for it and proof of such acknowledgement shall be furnished to the Engineer.

The Monthly Project Labour Reports shall be completed and submitted in accordance with the instructions therein and copies of all submitted documents must be kept on site be made available to the employer's agent upon request.

The **B-BBEE Sub-Contract Expenditure Report** is required for monitoring the prime contactor's compliance with the sub-contracting conditions of the **Preference Schedule**.

The Joint Venture Expenditure Report is required for monitoring the joint venture's compliance with the percentage contributions of the JV partners as tendered, where the joint venture has been awarded preference points in respect of its consolidated B-BBEE scorecard.

The Targeted Labour Contract Participation Expenditure Report (if applicable) is required for monitoring the contractor's compliance for achieving the specified minimum targeted labour contract participation goal (CPG_L) and, if applicable, for calculating any penalty in terms thereof.

The Targeted Enterprises Contract Participation Expenditure Report (if applicable) is required for monitoring the contractor's compliance for achieving the specified minimum targeted enterprises contract participation goal (CPG_E) and, if applicable, for calculating any penalty in terms thereof.

The Expenditure Reports shall be verified by the Engineer/Engineer's Representative.

In respect of Annexes 2 and 3, the Employer shall, in addition to any other sanctions available to it , apply the financial penalties applicable to breach of preferencing conditions in the **Preference Schedule** Preference Schedule in Part T2.2 Returnable Schedules. In the case of joint ventures (Annex 3), the contractor shall prove his compliance with item 6) in Section 2 of the Preference Schedule by providing a consolidated scorecard at his own cost on instruction from the Engineer.

3.5.2 PARTICIPATION OF TARGETED LABOUR

3.5.2.1 MINIMUM TARGETED LABOUR CONTRACT PARTICIPATION GOAL

In support of the National Department of Public Works' Expanded Public Works Programme which is aimed at alleviating poverty through the creation of temporary employment opportunities using labour intensive methodologies and practices where possible, the Employer is seeking to increase the intensity of labour, as appropriate, in all of its infrastructure sector projects.

It is a requirement of this contract, therefore, that the work be executed in such a manner so as to maximise the use of labour intensive construction methods in order to provide low and semi-skilled temporary employment opportunities.

To this end, a minimum targeted labour contract participation goal is specified below, which shall be achieved by the Contractor in the performance of the contract, failing which, penalties as described will be applied. The Contractor is required to provide all skills training where necessary, so as to ensure that a minimum level of competence is achieved and maintained, such that the various activities are carried out safely and to the required standard. The cost of training shall be included in the rates for the various work activities.

The specified minimum targeted labour contract participation goal (CPG_L) is | **0 %**

The minimum CPG_L is such that the Contractor will have to carry out some of the work that would normally have been undertaken using mechanised construction methods, by using labour intensive construction methods instead. It is left to the discretion of the Contractor to identify suitable work activities for the intensification of labour. The Contractor shall, within 5 working days of being requested in writing by the Engineer to do so, submit details of his/her plan to achieve the minimum CPG_L

3.5.2.2 DEFINITIONS

For the purposes of the requirements in respect of the participation of targeted labour, the following definitions shall apply:

"Target area" means the geographical area shown on plan in Part C4: Site Information

"Targeted labour contract participation goal (CPG_L)" means the sum of the wages (excluding any benefits), for which the Contractor, or any of his/her sub-contractors contracts targeted labour in the performance of the contract, expressed as a percentage of the value of the contract.

"Targeted labour" means low and semi-skilled individuals, whose wages (excluding any benefits) do not exceed the threshold value, who reside in the target area, that are employed by the Contractor, or any of his/her sub-contractors, in the performance of the contract.

"Threshold value" is **R350.00** per day as adjusted from time to time (excluding any benefits). The threshold value is not to be confused with any industry sector minimum wage determined in accordance with the Basic Conditions of Employment Act, 75 of 1977.

"Value of the contract" means the contract sum (accepted contract amount) less provisional sums, contingencies and VAT.

3.5.2.3 THE SELECTION AND RECRUITMENT OF TARGETED LABOUR

Where targeted labour is to be drawn from specific local communities (defined in terms of the target area), such labour shall be identified using the relevant Sub-Council Job-Seekers Database. The Contractor shall request, via a Community Liaison Officer (if required in terms of the contract), a list of suitable candidates from the database, from which the Contractor shall make his/her final selection. The contractor shall enter into written contracts of temporary employment with all targeted labour.

Any difficulty experienced by the Contractor in identifying candidates though the Job-Seekers Database, or as regards any matter relating to the employment of targeted labour, shall be immediately referred to the Engineer.

3.5.2.4 CONTRACT PARTICIPATION GOAL CREDITS

Credits towards the achieving the minimum CPG_L shall be granted by converting the total monetary value of wages paid to targeted labour (including that of sub-contractors) to a percentage of the value of the contract. No credits shall be accorded should the contractor/sub-contractor fail to enter into written contracts with the targeted labour. Furthermore, no credits shall be accorded in respect of targeted labour employed on work in respect of provisional sums or prime cost items. Such labour shall nevertheless be recorded on the Project Labour Report which is required to be furnished by the Contractor.

3.5.2.5 TRAINING OF TARGETED LABOUR

The Contractor is required to provide all informal (on-the-job) skills training so as to ensure that a minimum level of competence is achieved and maintained, such that the various activities are carried out safely and to the required standard. The cost of informal training shall be included in the rates for the various work activities.

3.5.2.6 PENALTIES

The financial penalty to be applied for failing to meet the specified minimum targeted labour contract participation goal in the performance of the contract (unless proven to be beyond the control of the Contractor), is as follows:

$$\text{Penalty} = (CPG_L{}^S - CPG_L{}^A) \times P^*$$

Where $CPG_L{}^S$ = the specified minimum targeted labour contract participation goal (expressed as a percentage).

$CPG_L{}^A$ = the targeted labour contract participation goal achieved (expressed as a percentage).

P^* = the value of the contract.

3.5.3 COMMUNITY LIAISON OFFICER

It is a requirement of this Contract that a Community Liaison Officer (CLO) shall be appointed by the Contractor. The primary functions of the CLO shall be to assist the Contractor with the selection and recruitment of targeted labour, to represent the local community in matters concerning the use of targeted labour (and/or enterprises) on the works, and to assist with and facilitate communication between the Contractor, the Engineer and the local communities.

The identification of suitable candidates (maximum 5; minimum 3) for the CLO position shall be resolved by the relevant Sub-council Manager through a process of advertising and shortlisting. Should suitable candidates not be identified through this process, the Contractor shall be allowed to seek candidates from the relevant Sub-Council Job-Seekers Database. The final selection and appointment of the CLO in terms of the contract shall be the responsibility of the Contractor.

The period of appointment of the CLO shall be as stated in the Contract for Temporary Employment as a Community Liaison Officer referred to below. The date of commencement of temporary employment of the CLO shall be as agreed with the Engineer.

It is required, therefore, that the Contractor enter into a contract of temporary employment with the selected CLO, the contracting parties being the Contractor and the CLO. To this end, a specimen Form of Contract of Temporary Employment as Community Liaison Officer is included in this document (Part C1.7: Agreement and Contract Data). This Form of Contract sets out, inter alia, the agreement between the parties, the duties and conditions of employment of the CLO. The rate of remuneration for the CLO, payable by the Contractor, is currently **R462.00** per day. As said contract will be between the Contractor and the CLO, all costs involved shall be borne by the Contractor and the tender shall be deemed to include for this.

3.5.4 PARTICIPATION OF TARGETED ENTERPRISES

3.5.4.1 MINIMUM TARGETED ENTERPRISES CONTRACT PARTICIPATION GOAL

It is a requirement of this contract that enterprises located within the target area, as defined, be engaged by the Contractor for the provision of supplies, services or works necessary for the performance of this contract.

To this end, a minimum targeted enterprises contract participation goal is specified below, which shall be achieved by the Contractor in the performance of the contract, failing which, penalties as described will be applied.

The specified minimum targeted enterprises contract participation goal (CPG_E) is | **0 %**

The Contractor shall engage targeted enterprises directly or indirectly in the performance of the contract to the extent that the total monetary value of such engagements (exclusive of VAT), expressed as a percentage of the value of the contract, is sufficient to achieve the specified minimum CPG_E.

3.5.4.2 DEFINITIONS

For the purposes of the requirements in respect of the participation of targeted enterprises, the following definitions shall apply:

"Target area" means the geographical area shown on plan in Part C4: Site Information

"Targeted enterprises contract participation goal (CPG_E)" means the value of supplies, services or works (exclusive of VAT), for which the Contractor contracts targeted enterprises, either directly or indirectly, in the performance of the contract, expressed as a percentage of the value of the contract.

"Targeted enterprises" means any sole trader, partnership or legal entity that acts as a supplier, manufacturer, service provider or sub-contractor, and which has its base of operations in the target area.

"Value of the contract" means the contract sum (accepted contract amount) less provisional sums, contingencies and VAT.

3.5.4.3 ACHIEVING THE CONTRACT PARTICIPATION GOAL

The contractor may achieve the specified minimum CPG_E as follows:

a) by engaging one or more targeted enterprises to perform commercially useful functions in the performance of the contract;

b) by engaging non-targeted enterprises, who in turn engage one or more targeted enterprises to perform commercially useful functions in the performance of the contract;

c) by a combination of the above.

The Contractor shall, within 5 working days of being requested by the Engineer to do so, submit details of his/her plan to achieve the minimum CPG_E.

3.5.4.4 CONTRACT PARTICIPATION GOAL CREDITS

Credits towards achieving the minimum CPG_E shall be granted by converting the total monetary value (exclusive of VAT) of the agreements between the Contractor, or Contractor's sub-contractors, and targeted enterprises, to a percentage of the value of the contract.

No credits shall be accorded should the Contractor (or sub-contractors):

a) make direct payment to third parties in connection with the contract on behalf of targeted enterprises, when such payment is recovered by making deductions from payments due to the targeted enterprise;

b) fail to enter into written contractual agreements with the relevant targeted enterprises.

Credits claimed towards the contract participation goal shall be denied where such written contractual agreements contain any of the following:

c) conditions which are more onerous than those that exist in the prime contract (this contract);

d) payment procedures based on a pay when paid system;

e) authoritarian rights given to the employing contractor, with no recourse to independent adjudication in the event of a dispute arising.

No credits may be claimed in respect of targeted enterprises that that do not adhere to statutory labour practices.

No credits shall be accorded in respect of targeted enterprises engaged on work in respect of provisional sums or prime cost items.

In the event that a targeted enterprise sub-contracts to another targeted enterprise, only the value of the higher level sub-contract shall be granted as credit towards achieving the specified minimum CPG_E.

In addition to the form required for contract administration (the Targeted Enterprises Contract Participation Expenditure Report), the Contractor shall furnish the Engineer, upon written request, with documentary evidence that the targeted enterprises have their base of operations in the target area, copies of the contractual agreements with the various targeted enterprises, as well as documentary proof of payments made to the various targeted enterprises.

3.5.4.5 PENALTIES

The financial penalty to be applied for failing to meet the specified minimum targeted enterprises contract participation goal in the performance of the contract (unless proven to be beyond the control of the Contractor), is as follows:

$$\text{Penalty} = (CPG_E{}^S - CPG_E{}^A) \times P^*$$

Where $CPG_E{}^S$ = the specified minimum targeted enterprises contract participation goal (expressed as a percentage).

$CPG_E{}^A$ = the targeted enterprises contract participation goal achieved (expressed as a percentage).

P^* = the value of the contract.

3.5.5 ENVIRONMENTAL MANAGEMENT PROGRAMME

The Contractor will be responsible for managing his activities so that damage to the environment is minimised, as per the specifications contained as per Particular Specification H: Environmental Management Specification and its Annexures are included in Volume 3A.

3.5.6 HEALTH AND SAFETY

The Contractor shall be responsible for complying with the Occupational Health and Safety Act, Act 85 of 1993, and specifically the Construction Regulations 2014 issued in terms of Section 43 of the Act (GNR 84 of 10 February 2014).

The Contractor is referred to Part T1.2 Tender Data. Notwithstanding the Project Health and Safety Specification included the Particular Specification G: Health and Safety Specification included in Volume 3A; the following shall apply.

3.5.6.1 HEALTH AND SAFETY REQUIREMENTS AND PROCEDURES

In terms of the provisions of Section 37(2) of the Occupational Health and Safety Amendment Act, 1993 (Act 85 of 1993), hereinafter referred to as the Act, the following arrangements and procedures shall apply between the Contractor and the Employer to ensure compliance by the Contractor with the provisions of the Act:

(i) The Contractor undertakes to acquaint the appropriate officials and employees of the Contractor with all relevant provisions of the Act and the Regulations promulgated in terms of the Act.

(ii) The Contractor undertakes that all relevant duties, obligations and prohibitions imposed in terms of the Act and Regulations on the Contractor will be fully complied with.

(iii) The Contractor accepts sole liability for such due compliance with the relevant duties, obligations and prohibitions imposed by the Act and Regulations and expressly absolves the Employer from himself being obliged to comply with any of the aforesaid duties, obligations and prohibitions, with the exception of such duties, obligations and prohibitions expressly assigned to the Employer in terms of the Act and its associated Regulations.

(iv) The Contractor agrees that any duly authorised officials of the Employer shall be entitled, although not obliged, to take such steps as may be necessary to monitor that the Contractor has conformed to his undertakings as described in paragraphs (i) and (ii) above, which steps may include, but will not be limited to, the right to inspect any appropriate site or premises occupied by the Contractor, or any appropriate records or safety plans held by the Contractor.

(v) The Contractor shall be obliged to report forthwith to the Employer and Engineer of any investigation, complaint or criminal charge which may arise as a consequence of the provisions of the Act and Regulations, pursuant to work performed in terms of this Contract, and shall, on written demand, provide full details in writing, to the Employer and Engineer, of such investigation, complaint or criminal charge.

(vi) The Contractor shall furthermore, in compliance with Constructional Regulations 2014 (Government Gazette 37305 and Regulation Gazette 10113 of 7 February 2014) to the Act acquaint himself with the requirements of the Employer's Health and Safety Specification as laid down in regulation 4(1)(a) of the Construction Regulation 2014, and prepare a suitably and sufficiently documented health and safety plan as contemplated in regulation 7(1)(a) of the Construction Regulation 2014 for approval by the Employer or his assigned agent. The Contractor's health and safety plan and risk assessment shall be submitted for approval, to the Employer or his agent, within 14 days of the Commencement Date and shall be implemented and maintained from the commencement of the Works.

The Contractor shall at all times be responsible for full compliance with the approved plan as well as with the Construction Regulations and no extension of time will be considered for delays due to non-compliance with the abovementioned plan or regulations.

(vii) The Employer, or his assigned agent, reserves the right to conduct periodic audits, as contemplated in the Construction Regulations 2014, to monitor that the Contractor is compliant in respect of his obligations. Failure by the Contractor to comply with the requirements of these Regulations shall entitle the Engineer, at the request of the Employer or his agent, to suspend all or any part of the Works, with no recourse whatsoever by the Contractor for any damages incurred as a result of such suspension, until such time that the Employer or his agents are satisfied that the issues in which the Contractor has been in default have been rectified.

(viii) The proposed type of work, materials to be used and potential hazards likely to be encountered on this Contract are detailed in the Parts C3.4 and C3.5, the Bill of Quantities, the Drawings, and in the Employers' Health and Safety Specification (regulation 5(1)(b) of the Construction Regulations 2014), which is contained in the Particular Specifications.

Payment items are included in the Bill of Quantities to cover the Contractor's cost for compliance with the OHS Act and the abovementioned regulations.

3.5.6.2 HEALTH AND SAFETY PLAN

Without limiting his obligations and liabilities in terms of the Construction Regulations, 2014 of the OHS Act, the Contractor, in his Health and Safety Plan to be submitted in terms of the Contract Data, shall inter alia deal with the safety provisions he will set up in respect of the aspects specified in the Specifications.

The Health and Safety Plan shall be neatly set out in a lever-arch type file, with labelled dividers for each section.

A copy of the approved Health and Safety Plan shall be kept on Site and made available upon request.

3.5.6.3 PROTECTION OF THE PUBLIC AND EMPLOYER'S STAFF

The Contractor shall at all times ensure that his operations do not endanger any member of the public, or the Employer's staff.

Open excavations and other hazardous conditions on site shall be barricaded and precautions shall be taken to protect the public from the same in terms of the OHS Act.

The Contractor shall direct, control, facilitate and safeguard all pedestrian traffic during construction of the Works, provide all notices, and arrange for watching and lighting in accordance with the requirements of the relevant authorities.

3.5.6.4 EXCAVATIONS

Without limiting his responsibility for the safety of his workers in any excavation, the Contractor shall ensure the safety of his workers in trenches and excavations deeper than 1,0 m. in terms of the provisions of the OHS Act. The Contractor may choose to batter excavations to a safe slope if sufficient space is available, or adequately shore the excavations.

3.5.6.5 WORKING AND ENTERING CONFINED SPACES

Confined space is defined in the Occupational Health and Safety Act, Act 85, 1993, as an enclosed, restricted, or limited space in which, because of its construction, location or contents, or any work activity carried on therein, a hazardous substance may accumulate or an oxygen-deficient atmosphere may occur, and includes any chamber, tunnel, pipe, pit, sewer, container, valve, pump, sump, or similar construction, equipment, machinery or object in which a dangerous liquid or dangerous concentration of gas, vapour, dust or fumes may be present.

(a) Hazardous conditions in confined spaces could be identified as:

Hazardous atmosphere:

- Too little or too much Oxygen (too little can cause brain damage and cause the heart to stop and too much increases the risk of fire or explosion)
- Presence of Toxic gases
- Liquids or solids inside the confined space. Liquids may produce hazardous atmosphere when it evaporates e.g. fuel
- Type of work done inside the confined space. Activities can lead to the release of harmful substances e.g. grinding, descaling etc.
- Contamination from outside/adjacent sources. A contaminant could enter the confined space through porous walls, communicating openings e.g. sewers

Explosive atmospheres:

- High concentration of Oxygen (>23%),
- Fuel e.g. Acetylene gas from leaking welding equipment;
- Methane gas and hydrogen sulphide produced by rotting organic waste in sewers;
- Hydrogen gas produced by contact between aluminium or galvanized metals and corrosive liquids;
- grain or coal dust;
- solvents such as acetone, ethanol, toluene, turpentine, and xylene which may be introduced into the space through spills) and
- Ignition sources e.g. open flames, welding arcs, chemical reaction, arcing of electrical motors etc.)

Physical hazards

- Loose and unstable material may lead to trapping or burying workers
- Slip, trip and fall hazards
- Falling objects from above
- Moving parts of equipment and machinery
- Electrical shock from defective extension cords, welding cables etc.
- Poor visibility
- Temperature extremes
- Noise
- Risk of drowning
- Rusted railings

(b) Safe work procedures for Confined Spaces shall include:

Only enter confined space after the air has been tested and evaluated by a competent person who has certified in writing that the space is safe and will remain safe for the duration of the work. Where the confined space cannot be certified as safe steps must be taken to ensure that any confined space in which there exists or is likely to exist a hazardous gas, vapour, dust or fumes, or which has or is likely to have, an oxygen content of less than 20 per cent by volume, is entered by an employee or other person only when;

- the confined space is purged and ventilated to provide a safe atmosphere therein and measures necessary to maintain a safe atmosphere therein have been taken; and
- the confined space has been isolated from all pipes, ducts and other communicating openings by means of effective blanking other than the shutting or locking of a valve or a cock, or, if this is not practicable, only when all valves and cocks which are a potential source of danger have been locked and securely fastened by means of chains and padlocks.

In an instance where it's not possible to purge and ventilate the confined space, the following precautions must be taken:

- the confined space is entered only when the employee or person entering is using breathing apparatus of a type approved by the chief inspector and, further, that;
- the confined space has been isolated from all pipes, ducts and other communicating openings by means of effective blanking other than the shutting or locking of a valve or a cock, or, if this is not practicable, only when all valves and cocks which are a potential source of danger have been locked and securely fastened by means of chains and padlocks any employee or person entering the confined space is using a safety harness or other similar equipment, to which a rope is securely attached which reaches beyond the access to the confined space, and the free end of which is attended to by a person referred to in paragraph (c);
- at least one other person trained in resuscitation is and remains in attendance immediately outside the entrance of the confined space in order to assist or remove any or persons from the confined space, if necessary; and
- effective, approved apparatus for breathing and resuscitation is available immediately outside the confined space.

Ensure that everybody vacate the confined space after completion of any work therein. Where the hazardous gas, vapour, dust or fumes are of an explosive or flammable nature, further steps must be taken to ensure that such a confined space is entered only if –

- the concentration of the gas, vapor, dust or fumes does not exceed 25 percent of the lower explosive limit of the gas, vapor, dust or fumes concerned
- where the work to be performed is of such a nature that it does not create a source of ignition; or
- such concentration does not exceed 10 per cent of the lower explosive limit of the gas, vapor, dust or fumes where other work is performed

Employees required to work in confined spaces must be trained and competent in confined space procedures. Working alone in a confined space is not permitted. A Confined Space Entry Permit is required for entry prior to any work performed in a confined space. A suitably trained person must undertake a written risk assessment before carrying out work involving entry into a confined space. The assessment shall take into account the following:

- the nature of the confined space;
- the work required and the methods by which the work can be done;
- the hazards involved and associated risks;
- implementation of control measures;
- the emergency and rescue procedures.

The risk assessment must be signed by all the people involved in the work to be done in the confined space. Communication between people in a confined space must be established as well as communication with any stand-by staff located outside. Rescue procedures must be established before entry into any confined space which, include a stand-by person. If working under a contractor or client's entry permit, this must be reviewed by a suitably qualified Health and Safety Specialist person to ensure adequacy of risk assessment, control measures and safe working procedures before entry.

3.5.6.6 HEALTH AND SAFETY SPECIALIST

The Contractor shall employ a health and safety specialist, with suitable and proven qualifications, either on full-time or part-time basis, for the duration of the Contract. This specialist shall assist with the preparation of the health and safety plan, shall provide on-going training for all construction staff (at least 1 hour per week whilst work on site is in progress, in the form of weekly tool-box talks), and shall assist with the upkeep of the health and safety plan and associated regular inspections etc.

The requirement for a weekly presence on Site necessitates that the Health and Safety Specialist be based locally, at least for the period while the Contractor is working on Site (i.e. site establishment, site clearance, earthworks, construction).

3.5.6.7 MONTHLY HEALTH AND SAFETY REPORTS

The health and safety specialist required in terms of C3.5.6.6 shall submit a report to the Engineer at the monthly site meetings, detailing the state of health and safety on the site over the last month, new risk assessments added, potential new risks, new precautions taken, and summarising the results of various inspections required in terms of the health and safety plan, etc. If this report is not submitted at each monthly site meeting, the Engineer shall impose a fine of R5000.00 on the Contractor, in each instance.

3.5.7 PROGRAMMING AND PLANNING

The Construction Programme shall be submitted to the Engineer within 14 days of the commencement date by the Contractor and shall meet the following requirements:

(a) Be in the form of a bar chart/Gantt chart
(b) Clearly indicate the start and end dates and duration of all construction activities and identify the critical path
(c) Take full cognizance of all the Contractor's risks and obligations in terms of the Contract
(d) Indicate key dates in respect of work to be carried out by others in accordance with the table that follows
(e) Indicate key dates in respect of information to be provided by the Engineer and/or others.

The said Programme and all revisions thereto shall also be provided to the Engineers in electronic digital format using the MS PROJECT software.

The programme shall be updated monthly during the contract period. In addition to the above, a monthly cash flow forecast shall also be submitted to the Engineer.

The Contractor must plan their works and order of works to allow the existing WWTW to operate satisfactorily.

When drawing up his programme, the Contractor shall, take into consideration and make allowance for, inter alia:

(a) Expected weather conditions and their effects,
(b) Known physical conditions or artificial obstructions
(c) Searching for, dealing with and carrying out alterations to the existing services
(d) The accommodation of public access and traffic
(e) The provision and implementation of the health and safety plan in terms of the Construction Regulations, 2014 of the Occupational Health and Safety Act
(f) Time required for the biological processes to establish and stabilise

The following key dates shall apply:

(a) It is anticipated that the instruction for Commencement of the Works will be within 14 days of the Commencement date as per Clause 8.1 of the General Conditions of Contract

(b) The Contractor shall complete the entire Works within the period stated in C1.2:
The time for completion of the whole of the Works including the Trial Operation Period is **54 (Fifty-Four) months** and inclusive of all special non-working days. Further, the programme shall be subject to the following access dates for the various process units:

SCOPE OF WORKS	CIVIL SECTIONAL COMPLETION DATE - READY FOR INSTALLATION OF EQUIPMENT	ALLOW M&E CONTRACTOR ACCESS FOR INSTALLATION	HOT COMMISSIONING OF EQUIPMENT (REFER TO NOTE 2)	PHASE	SPECIAL NOTE APPLICABLE TO CONTRACT NO. 191Q/2023/24
	Months in this column refers to the end (i.e., last day) of the Month (unless otherwise stated)	**Months in this column refers to the start (i.e., first day) of the Month (unless otherwise stated)**	**Months in this column refers to the start (i.e., first day) of the Month (unless otherwise stated)**		
	Dates below is "Months after Commencement of Works" – Example provided below for the Inlet Works				
Process Units					
Inlet Works	28 Months after Commencement of the Works	Month 29 after Commencement of the Works (Partial Hand-over, refer to Note 1)	Month 37 after Commencement of the Works	1	Following the hand-over to the M&E Contractor for access, the Civil Contractor will be allowed to continue with works on this structure subject to the approval of the Engineer and provided this works does not impact the M&E Contractor, the M&E Contractor is given full access to the structure and the structure is made safe for the M&E Contractor.
Primary Settling Tank Splitter	27 Months	Month 29	Month 37	1	None
Primary Settling Tanks	28 Months	Month 31	Month 37	1	None
Reactor Flow Splitter and Reactor Flow Mixer	31 Months	Month 34	Month 37	1	None
Biological Reactors 1 and 2	26 Months	Month 27 (Partial Hand-over, refer to Note 1)	Month 37	1	Following the hand-over to the M&E Contractor for access, the Civil Contractor will be allowed to continue with works on this structure subject to the approval of the Engineer and provided this works does not impact the M&E Contractor, the M&E Contractor is given full access to the structure and the structure is made safe for the M&E Contractor.
Biological Reactors 3 and 4	30 Months	Month 31 (Partial Hand-over, refer to Note 1)	Month 37	1	Following the hand-over to the M&E Contractor for access, the Civil Contractor will be allowed to continue with works on this structure subject to the approval of the Engineer and provided this works does not impact the M&E Contractor, the M&E Contractor is given full access to the structure and the structure is made safe for the M&E Contractor.
Secondary Settling Tanks Splitter	33 Months	Month 35	Month 37	1	None

SCOPE OF WORKS	CIVIL SECTIONAL COMPLETION DATE - READY FOR INSTALLATION OF EQUIPMENT	ALLOW M&E CONTRACTOR ACCESS FOR INSTALLATION	HOT COMMISSIONING OF EQUIPMENT (REFER TO NOTE 2)	PHASE	SPECIAL NOTE APPLICABLE TO CONTRACT NO. 191Q/2023/24
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	Dates below is "Months after Commencement of Works" – Example provided below for the Inlet Works				
Secondary Settling Tanks Splitter	33 Months	Month 35	Month 37	1	None
Secondary Settling Tanks	28 Months	Month 29	Month 37	1	None
RAS Return Channel	33 Months	Month 34	Month 37	1	None
Effluent Channels (Phase 1)	32 Months	Month 35	Month 37	1	None
Bypass Effluent Channel	34 Months	Month 35	Month 37	1	None
River Outlet Structure	33 Months	-	-	1	None
UV Channels and Building	28 Months	Month 29	Month 37	1	None
Primary Sludge Screening Facility	30 Months	Month 34	Month 37	1	None
Gravity Thickeners	26 Months	Month 31	Month 37	1	None
Anaerobic Digesters	27 Months	Month 29	Month 37	1	None
Sludge Holding Tanks	27 Months	Month 32	Month 37	1	None
Sludge Silos	27 Months	Month 31	Month 37	1	None

SCOPE OF WORKS	CIVIL SECTIONAL COMPLETION DATE - READY FOR INSTALLATION OF EQUIPMENT	ALLOW M&E CONTRACTOR ACCESS FOR INSTALLATION	HOT COMMISSIONING OF EQUIPMENT (REFER TO NOTE 2)	PHASE	SPECIAL NOTE APPLICABLE TO CONTRACT NO. 191Q/2023/24
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	Dates below is "Months after Commencement of Works" – Example provided below for the Inlet Works				
Return Flow Pump Station	33 Months	Month 34	Month 37	1	None
Main Sludge Transfer Pump Station	27 Months	Month 29	Month 37	1	None
Gas Holding Tanks	29 Months	Month 31	Month 37	1	None
Gas Cleaning Facility	29 Months	Month 31	Month 37	1	None
Service Water Pump Station	30 Months	Month 31	Month 37	1	None
Ancillary Structures	33 Months	Month 34	Month 37	1	None
Existing Maturation Pond 01 Modifications (New Pond 01, 02 & 03 as per drawing DRG-CC-002)	31 Months	Month 35	Month 37	1	None
Existing Maturation Pond 04 Refurbishment (New Pond 06 as per drawing DRG-CC-002)	32 Months	Month 34	Month 37	1	None
Existing Maturation Pond 02 & 03 Refurbishment (New Pond 04 & 05 respectively, as per drawing DRG-CC-002)	35 Months	Month 36	Month 37	1	None
Flow Balancing Tank	49 Months	Month 50 (Partial Hand-over, refer to Note 1)	Month 52	2	Following the hand-over to the M&E Contractor for access, the Civil Contractor will be allowed to continue with works on this structure subject to the approval of the Engineer and provided this works does not impact the M&E Contractor, the M&E Contractor is given full access to the structure and the structure is made safe for the M&E Contractor.

SCOPE OF WORKS	CIVIL SECTIONAL COMPLETION DATE - READY FOR INSTALLATION OF EQUIPMENT	ALLOW M&E CONTRACTOR ACCESS FOR INSTALLATION	HOT COMMISSIONING OF EQUIPMENT (REFER TO NOTE 2)	PHASE	SPECIAL NOTE APPLICABLE TO CONTRACT NO. 191Q/2023/24
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	Dates below is "Months after Commencement of Works" – Example provided below for the Inlet Works				
Effluent Channels (Phase 2)	49 Months	Month 50	Month 52	2	None
Chlorine Contact Tank	49 Months	Month 50 (Partial Hand-over, refer to Note 1)	Month 52	2	Following the hand-over to the M&E Contractor for access, the Civil Contractor will be allowed to continue with works on this structure subject to the approval of the Engineer and provided this works does not impact the M&E Contractor, the M&E Contractor is given full access to the structure and the structure is made safe for the M&E Contractor.
Treated Sewage Effluent (TSE) & Filter Building	48 Months	Month 49 (Partial Hand-over, refer to Note 1)	Month 52	2	Following the hand-over to the M&E Contractor for access, the Civil Contractor will be allowed to continue with works on this structure subject to the approval of the Engineer and provided this works does not impact the M&E Contractor, the M&E Contractor is given full access to the structure and the structure is made safe for the M&E Contractor.
Pipelines					
Diversion of incoming mains to new Inlet Works (live switch-over to new Inlet Works)	37 Months	-	-	1	To be programmed to take place at the start of hot commissioning of Phase 1 which is the start of Month 37.
Process Pipelines	35 Months	-	-	1	None
Service Water Reticulation	33 Months	-	-	1	None
Potable Water Reticulation	32 Months	-	-	1	None
Onsite Sewage Reticulation	34 Months	-	-	1	None

SCOPE OF WORKS	CIVIL SECTIONAL COMPLETION DATE - READY FOR INSTALLATION OF EQUIPMENT	ALLOW M&E CONTRACTOR ACCESS FOR INSTALLATION	HOT COMMISSIONING OF EQUIPMENT (REFER TO NOTE 2)	PHASE	SPECIAL NOTE APPLICABLE TO CONTRACT NO. 191Q/2023/24
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	Dates below is "Months after Commencement of Works" – Example provided below for the Inlet Works				
Buildings					
Inlet Works Electrical Building	26 Months	Month 29	Month 37	1	None
Reactor Electrical Building	26 Months	Month 28	Month 37	1	None
Blower and Electrical Building	26 Months	Month 28	Month 37	1	None
UV, SST and Flow Balancing Tank Electrical Building	26 Months	Month 28	Month 37	1	None
Service Water Pump Station Electrical Building	30 Months	Month 33	Month 37	1	None
Boiler House	31 Months	Month 33	Month 37	1	None
Dewatering Building	24 Months	Month 25 (Partial Hand-over, refer to Note 1)	Month 37	1	Following the hand-over to the M&E Contractor for access, the Civil Contractor will be allowed to continue with works on this building subject to the approval of the Engineer and provided this works does not impact the M&E Contractor, the M&E Contractor is given full access to the building and the building is made safe for the M&E Contractor.
MV Intake Substation	25 Months	Month 26	Month 34	1	None
Centralised Generator Building	22 Months	Month 24	Month 34	1	None
CHP Building	28 Months	Month 30	Month 37	1	None

SCOPE OF WORKS	CIVIL SECTIONAL COMPLETION DATE - READY FOR INSTALLATION OF EQUIPMENT	ALLOW M&E CONTRACTOR ACCESS FOR INSTALLATION	HOT COMMISSIONING OF EQUIPMENT (REFER TO NOTE 2)	PHASE	SPECIAL NOTE APPLICABLE TO CONTRACT NO. 191Q/2023/24
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	Dates below is "Months after Commencement of Works" – Example provided below for the Inlet Works				
Process Operations Building	35 Months	Month 36 (Partial Hand-over, refer to Note 1)	Month 37	1	Following the hand-over to the M&E Contractor for access for parts of this building, the Civil Contractor will be allowed to continue with works on this building subject to the approval of the Engineer and provided this works does not impact the M&E Contractor, the M&E Contractor is given access to parts of the building (i.e., Control Room and Server Room) and the building is made safe for the M&E Contractor.
Weigh Bridge and Building	35 Months	-	-	1	None
Guard House	34 Months	-	-	1	None
Security Hut	6 Months	-	-	1	None
Chlorination building	49 Months	Month 50	Month 52	2	None
Workshop and Store Building	50 Months	Month 51 (Partial Hand-over, refer to Note 1)	-	2	None
Demolition Works					
Existing Fencing	10 Months	-	-	1	Subject to completion of new security wall and fencing.
Existing sludge ponds and associated ancillary infrastructure	8 Months	-	-	1	None
Existing chlorine contact tank	26 Months	-	-	1	None

SCOPE OF WORKS	CIVIL SECTIONAL COMPLETION DATE - READY FOR INSTALLATION OF EQUIPMENT	ALLOW M&E CONTRACTOR ACCESS FOR INSTALLATION	HOT COMMISSIONING OF EQUIPMENT (REFER TO NOTE 2)	PHASE	SPECIAL NOTE APPLICABLE TO CONTRACT NO. 191Q/2023/24
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	Dates below is "Months after Commencement of Works" – Example provided below for the Inlet Works				
Existing river outlet	38 Months	-	-	2	None
Existing guard house	19 Months	-	-	1	None
Existing administration building	19 Months	-	-	1	Subject to the commissioning of temporary facilities to house municipal staff from existing Administration building, existing workshop, store and laboratory building.
Existing workshop, store and laboratory building	19 Months	-	-	1	Subject to the commissioning of temporary facilities to house municipal staff from existing Administration building, existing workshop, store and laboratory building.
All existing pipelines, ancillary structures and services in the Phase 1 construction area which will not form part of the upgrade	8 Months	7 Months (Refer to Note 3)	-	1	None
Existing six (6) SST's and associated infrastructure (splitters and collection chambers)	39 Months	37 Months (Refer to Note 3)	-	2	None
Existing board room building and house	38 Months	-	-	2	None
Existing chlorine building	51 Months (Access Mid-month, Completion end of Month)	51 Months (Start of Month) (Refer to Note 3)	-	2	None
Existing irrigation and wash water pumpstation building	38 Months	37 Months (Refer to Note 3)	-	2	None
Existing biological reactor 1 and associated infrastructure, including MCC and screw lift pump station 1	39 Months	37 Months (Refer to Note 3)	-	2	None
Existing screw lift pump station 2	38 Months	37 Months (Refer to Note 3)	-	2	None

SCOPE OF WORKS	CIVIL SECTIONAL COMPLETION DATE - READY FOR INSTALLATION OF EQUIPMENT	ALLOW M&E CONTRACTOR ACCESS FOR INSTALLATION	HOT COMMISSIONING OF EQUIPMENT (REFER TO NOTE 2)	PHASE	SPECIAL NOTE APPLICABLE TO CONTRACT NO. 191Q/2023/24
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	Dates below is "Months after Commencement of Works" – Example provided below for the Inlet Works				
Existing generator building	38 Months	37 Months (Refer to Note 3)	-	2	None
Existing inlet works and associated infrastructure	38 Months	37 Months (Refer to Note 3)	-	2	None
Existing inlet works MCC building	38 Months	37 Months (Refer to Note 3)	-	2	None
Existing dewatering building and sludge silos	38 Months	37 Months (Refer to Note 3)	-	2	None
All existing pipelines, ancillary structures and services in the Phase 2 construction area which will not form part of the upgrade	38 Months	37 Months (Refer to Note 3)	-	2	None
General Civil Works					
Boundary Security Wall and Fencing	10 Months	-	-	1	None
Site Clearance, Sludge Lagoon Pond Dredging and Bulk Earthworks (Phase 1)	8 Months	-	-	1	None
Cable Ducts (Phase 1)	35 Months	-	-	1	Subject to M&E Contractors programme. Civil Contractor to allow for phased completion between Months 31 and 35 for planning purposes.
Roads and Stormwater (Phase 1)	40 Months	-	-	1	None
Site Clearance and Bulk Earthworks (Phase 2)	40 Months	-	-	2	None

SCOPE OF WORKS	CIVIL SECTIONAL COMPLETION DATE - READY FOR INSTALLATION OF EQUIPMENT	ALLOW M&E CONTRACTOR ACCESS FOR INSTALLATION	HOT COMMISSIONING OF EQUIPMENT (REFER TO NOTE 2)	PHASE	SPECIAL NOTE APPLICABLE TO CONTRACT NO. 191Q/2023/24
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	Dates below is "Months after Commencement of Works" – Example provided below for the Inlet Works				
Cable Ducts (Phase 2)	48 Months	-	-	2	Subject to M&E Contractors programme. Civil Contractor to allow for phased completion between Months 46 and 47 for planning purposes.
Roads and Stormwater (Phase 2)	53 Months	-	-	2	None
Landscaping	54 Months	-	-	2	Allow 6 months for landscaping, commencing at the start of Month 49.

Notes:

1) Note: "Partial Hand-over" - Part of the building/structure will be handed over by other (Civil Contractor) to Contractor for the Mechanical and Electrical Installation.
2) Month 37: Start of Hot Commissioning of Phase 1 by M&E Contractor (Contract No. 191Q/2023/24) i.e. the switch-over of flow from the old works to the new works. Commencement of the Phase 2 infrastructure may start in Month 37. Phase 1 Trial and Operation Period scheduled to commence in Month 41 over a period of three months.

   Month 52: Start of Hot Commissioning of Phase 2 by M&E Contractor (Contract No. 191Q/2023/24) i.e. commissioning of balance of new works. Phase 2 Trial and Operation Period scheduled to commence in Month 54 over a period of one month.
3) M&E Contractor allowed access to remove existing equipment and associated infrastructure prior to demolition of concrete/masonry structure.

*Note: “Partial Hand-over” - Part of the building/structure will be handed over by other (Civil Contractor) to Contractor for the Mechanical and Electrical Installation.

The Contractor is to take cognisance of the fact that some of the new and existing structures may remain empty for a period of time until installation of the mechanical and electrical equipment or hot commissioning thereof. This poses a risk of the structure becoming buoyant / floating during periods of a high ground water table. This is applicable to all buried water retaining and water-excluding (i.e., structure keeping water out) structures (including channels and sumps etc.), and excludes any buildings. Two scenarios are applicable for dealing with ground water where scenario 1 is applicable to the Civil Contractor, and scenario 2 is applicable to the Mechanical and Electrical (M&E) Contractor.

- Scenario 1, dealing with groundwater table prior to M&E installation, or any other period when the structure is in possession of the Civil Contractor:
    - Where a structure is being emptied or remains empty it is noted that the floatation design of the structure relies on maintaining (via pumping if necessary) groundwater levels around the structure below the lowest top of concrete floor level (or a specified level stated on the latest construction drawings). For these structures, the underdrainage system should be maintained and fully operational at all times to facilitate pumping and monitoring.
    - After the construction of all concrete elements, structures to be filled with water to avoid buoyancy risk. Water levels to be filled to top water level as per latest construction drawings, unless otherwise agreed and approved by the Engineer. The Civil Contractor will be responsible for filling the structure.
    - In terms of sequencing of the works, this scenario runs up until the period when “Allow M&E Contractor Access for Installation” or will apply if the structure is handed back to the Civil Contractor (i.e., civil contractor takes possession) after M&E Contractor Access for Installation.
- Scenario 2, dealing with groundwater table during M&E installation or commissioning, or any other period when the structure is in possession of the M&E Contractor:
    - When the M&E contractor is allowed access to the structure for installation, if the structure contains water as a result of dealing with buoyancy the M&E contractor will be responsible for draining the water in the structure in order to proceed with the installation. While the structure is being emptied and for the duration of it being empty floatation design of the structure relies on maintaining (via pumping if necessary) groundwater levels around the structure below the lowest top of concrete floor level (or a specified level stated on the latest construction drawings). For these structures, the underdrainage system should be maintained and fully operational at all times to facilitate pumping and monitoring.
    - After the installation of the M&E equipment it is recommended that structures to be filled with water to avoid buoyancy risk. Water levels to be filled to top water level as per latest construction drawings, unless otherwise agreed and approved by the Engineer. The M&E Contractor will be responsible for filling the structure.
    - In terms of sequencing of the works, this scenario runs from the period when “Allow M&E Contractor Access for Installation” and up until hot commissioning. Once a structure has been hot commissioned it is assumed that the structure is operating at its design levels.

3.5.8 WORKS NOT TO INTERFERE

The Contractor is to take cognisance of the fact that the proposed site for the Works is located in close proximity to the industrial area and within the existing WWTW. The Contractor shall ensure that the Works do not affect operations of the aforementioned facilities.

The Contractor is to take cognisance of the fact that the Works is to remain operational during construction and interference with the existing process must be kept to a minimum. The Contractor shall ensure that:

a) The Contractor’s site staff shall cooperate with the Employer’s staff.
b) The Employer’s rules and requirements for operations are adhered to.
c) Site staff is familiar with and comply with the Employer’s emergency procedures.
d) Activities of the Site staff do not adversely affect the health and safety of the Employer’s staff once the Works is put into operation.

3.5.9 UNAUTHORIZED PERSONS

The Contractor shall keep unauthorized persons from the Works at all times.

3.5.10 MANAGEMENT MEETINGS

3.5.10.1 TECHNICAL MEETINGS

Technical meetings shall be held on an ad-hoc basis as required either by the Engineer or the Contractor.

The Contractor shall arrange for the Contractor's project manager and the Contractor's Technical Supervisor to attend these meetings. The Contractor shall also arrange for the Technical Inspector to attend.

The Engineer or his authorized representative will make notes of the decisions taken and hand these to the Contractor within seven (7) working days. The Contractor shall attend to these items and shall provide all present with copies of the notes within one working day.

3.5.10.2 SITE MEETINGS

Site meetings shall be held monthly. The Contractor shall arrange for the Contractor's Representative to be present at these meetings.

The Engineer will take minutes of these meetings and distribute these to all relevant parties at least one week prior to the next site meeting.

3.5.10.3 HEALTH AND SAFETY MEETINGS

Health and Safety Meetings shall be held monthly.

3.5.10.4 HAZOP MEETING

HAZOP Meeting will be called by the Contractor at the commencement of the Contract and prior to installation of mechanical and electrical equipment.

3.5.10.5 DEFECTS NOTIFICATION PERIOD

The Contractor shall attend meetings during the Defects Notification Period called by the Engineer.

3.5.11 ELECTRONIC PAYMENTS

The Contractor shall provide his banking details to enable electronic payments to be made for all payment certificates; such payments shall be at the direction of Municipality's Director of Procurement.

CITY OF CAPE TOWN

DIRECTORATE: WATER AND SANITATION

CONTRACT NO. 191Q/2023/24

DESIGN BUILD OF MECHANICAL AND ELECTRICAL WORKS FOR THE UPGRADING AND EXPANSION OF THE MACASSAR WASTEWATER TREATMENT WORKS

C3.6 Annexes

CONTENTS

Annex 1: Monthly Project Labour Report

Annex 2: B-BBEE Sub-Contract Expenditure Report

Annex 3: Joint Venture Expenditure Report

Annex 4: Targeted Labour Contract Participation Expenditure Report

Annex 5: Targeted Enterprises Contract Participation Expenditure Report

ANNEX 1

CITY OF CAPE TOWN
MONTHLY PROJECT LABOUR REPORT

CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

Instructions for completing and submitting forms

General

1 The Monthly Project Labour Reports must be completed in full, using typed, proper case characters; alternatively, should a computer not be available, handwritten in black ink.

2 Incomplete / incorrect / illegible forms will not be accepted.

3 Any conditions relating to targeted labour stipulated in the Contract (in the case of contracted out services or works) shall apply to the completion and submission of these forms.

4 This document is available in Microsoft Excel format upon request from the City's EPWP office, tel 021 400 9406, email EPWPLR@capetown.gov.za.

Project Details

5 If a field is not applicable insert the letters: NA

6 Only the Project Number supplied by the Corporate EPWP Office must be inserted. The Project Number can be obtained from the Coordinator or Project Manager or from the e-mail address in point 4 above.

7 On completion of the contract or works project the anticipated end date must be updated to reflect the actual end date.

Beneficiary Details and Work Information

8 Care must be taken to ensure that beneficiary details correspond accurately with the beneficiary's ID document.

9 A new beneficiary is one in respect of which a new employment contract is signed in the current month. A certied ID copy must accompany this labour report on submission.

10 Was the beneficiary sourced from the City's job seeker database?

11 The contract end date as stated in the beneficiary's employment contract.

12 Where a beneficiary has not worked in a particular month, the beneficiary's name shall not be reflected on this form at all for the month in question.

13 Training will be recorded separately from normal working days and together shall not exceed the maximum of 23 days per month

14 Workers earning more than the maximum daily rate (currently R450 excluding any benefits) shall not be reflected on this form at all.

Submission of Forms

15 Signed hardcopy forms must be scanned and submitted to the City's project manager in electronic (.pdf) format, together with the completed form in Microsoft Excel format.

16 Scanned copies of all applicable supporting documentation must be submitted along with each monthly project labour report. Copies of employment contracts and ID documents are only required in respect of new beneficiaries.

17 If a computer is not available hardcopy forms and supporting documentation will be accepted.

PROJECT DETAILS

Numbers in cells below e.g (6) refer to the relevant instruction above for completing and submitting forms

CONTRACT OR WORKS PROJECT NAME: (6)		EPWP SUPPLIED PROJECT NUMBER: (6)	
DIRECTORATE:		DEPARTMENT:	
CONTRACTOR OR VENDOR NAME:		CONTRACTOR OR VENDOR E-MAIL ADDRESS:	
CONTRACTOR OR VENDOR CONTACT PERSON:		CONTRACTOR OR VENDOR TEL. NUMBER:	CELL WORK

PROJECT LABOUR REPORT CURRENT MONTH (mark with "X")

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR				

ACTUAL START DATE (yyyy/mm/dd)								ANTICIPATED / ACTUAL END DATE (yyyy/mm/dd) (7)							

TOTAL PROJECT EXPENDITURE / VALUE OF WORK DONE TO-DATE (INCLUDING ALL COSTS, BUT EXCLUDING VAT)													
R													

ANNEX 1 (continued)

MONTHLY PROJECT LABOUR REPORT

CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

BENEFICIARY DETAILS AND WORK INFORMATION

CONTRACT OR WORKS PROJECT NUMBER:		Year	Month	Sheet		
				1	of	

	(8)	(8)	(8)	(9)			(10)		(11)	(12)	(13)	(14)
No.	First name	Surname	ID number	New Beneficiary (Y/N)	Gender (M/F)	Disabled (Y/N)	Job seeker database (Y/N)	Contract start date (DDMMYY)	Contract end date (DDMMYY)	No. days worked this month (excl. training)	Training days	Rate of pay per day (R – c)
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
										0	0	R -

Declared by Contractor or Vendor to be true and correct:	Name		Signature	
	Date			

Received by Employer's Agent / Representative:	Name		Signature	
	Date			

ANNEX 2 CITY OF CAPE TOWN

CONTRACT NO. AND NAME: .....

CONTRACTOR: .....

B-BBEE SUB-CONTRACT EXPENDITURE REPORT BASED ON PAYMENT CERTIFICATE NO. .....

Value of the contract (as defined in the **Preference Schedule**) (**P***)	R	B-BBEE Status Level of Prime Contractor	

Name of Sub-contractor (list all)	**B-BBEE Status Level of Sub-contractor[1]**	**Total value of Sub-contract (excl. VAT)[1]**	**Value of Sub-contract work to date (excl. VAT)[1]**	**Value of Sub-contract work to Sub-contractors with a lower B-BBEE Status Level than Prime Contractor**
Sub-contractor A		R	R	R
Sub-contractor B		R	R	R
Sub-contractor C		R	R	R

[1]Documentary evidence to be provided

Total:	R
Expressed as a percentage of **P***	%

Signatures

Declared by Contractor to be true and correct: ..... **Date:** .....

Verified by Engineer/ Engineer's Agent's Representative: ..... **Date:** .....

ANNEX 3 CITY OF CAPE TOWN

CONTRACT NO. AND NAME: .....

CONTRACTOR: .....

JOINT VENTURE EXPENDITURE REPORT BASED ON PAYMENT CERTIFICATE NO. .....

Value of the contract (as defined in the **Preference Schedule**) (**P***)	R	B-BBEE Status Level of Joint Venture	

Name of Joint Venture partner (list all)	**B-BBEE Status Level of each JV partner as at contract award**	**Percentage contribution of JV partner per JV Agreement[1] A**	**Total value of JV partner's contribution (excl. VAT)[1] B = A% x P***	**Value of JV partner's contribution to date (excl. VAT)[1] C**	**Value of JV partner's contribution as a percentage of the work executed to date D = C/P*x100**
JV Partner A		%	R	R	%
JV Partner B		%	R	R	%
JV Partner C		%	R	R	%

[1]Documentary evidence to be provided

Signatures

Declared by Contractor to be true and correct: ..... **Date:** .....

Verified by Engineer/ Engineer's Representative: ..... **Date:** .....

ANNEX 4 CITY OF CAPE TOWN

CONTRACT NO. AND NAME: .....

CONTRACTOR: .....

TARGETED LABOUR CONTRACT PARTICIPATION EXPENDITURE REPORT BASED ON CERTIFICATE NO. .....

Value of the contract (as defined in the **Preference Schedule**) (**P***)	R

Specified Targeted Labour Contract Participation Goal	%

Name of Contractor/Sub-contractor (list all)	**Total previous expenditure on wages in respect of targeted labour**	**Net Amount for this month[1]**	**Total expenditure on wages in respect of targeted labour**
Contractor	R	R	R
Sub-contractor A	R	R	R
Sub-contractor B	R	R	R
[1]Documentary evidence to be provided		Total:	R
		Expressed as a percentage of **P***	%

Signatures

Declared by Contractor to be true and correct: ..... **Date** .....

Verified by Engineer/ Engineers's Representative: ..... **Date** .....

ANNEX 5 CITY OF CAPE TOWN

CONTRACT NO. AND NAME: .....

CONTRACTOR: .....

TARGETED ENTERPRISES CONTRACT PARTICIPATION EXPENDITURE REPORT BASED ON CERTIFICATE NO. .....

Value of the contract (as defined in the **Preference Schedule**) (**P***)	R

Specified Targeted Enterprises Contract Participation Goal	%

Name of targeted enterprise (list all)	**Total previous expenditure (excl. VAT) to targeted enterprises**	**Net Amount for this month[1]**	**Total expenditure (excl. VAT) to targeted enterprises**
Targeted Enterprise A	R	R	R
Targeted Enterprise B	R	R	R
Targeted Enterprise C	R	R	R

[1]Documentary evidence to be provided

Total:	R
Expressed as a percentage of **P***	%

Signatures

Declared by Contractor to be true and correct: _____ **Date** .....